THE JOURNAL OF

MEDICAL EDUCATION

OFFICIAL PUBLICATION OF
THE ASSOCIATION OF AMERICAN MEDICAL COLLEGES

JULY 1960 • VOLUME 35 • NUMBER 7

637 **A Retrospective Evaluation of Research in the Medical Curriculum**
Arthur Ebbert, Jr.

644 **The Teaching of Preventive Medicine Reflected by Results of National Board Examinations**
John P. Hubbard

652 **Objectives of Biostatistics Instruction in the Medical School**
Carl E. Hopkins

655 **Social and Preventive Medicine as an Undergraduate Academic Discipline in the University College of the West Indies**
R. John Gourlay

660 **Electronic Instrumentation in a Medical Physiology Laboratory—an Evaluation after 2 Years' Experience**
Clarence N. Peiss, Robert D. McCook, Allen A. Rovick, and Walter C. Randall

666 **Some Effects on the Clinical Faculty of a Critical Incident Study of the Performance of Students**
Frederick Herzberg, Scott Inkley, and William R. Adams

675 **Well Baby Clinics in the First-Year Medical Curriculum: The Family Medicine Course at the University of California at Los Angeles**
Arthur H. Parmelee, Jr., Lonis Liverman, Nathalie Kennedy, Miriam G. Wilson, and Justin D. Call

684 **Roswell Park Research Participation Summer Program: Implications for Professional Education**
Edwin A. Mirand, George E. Moore, and James T. Grace, Jr.

689 **Psychiatry—Inherited or Acquired Knowledge**
Edward A. Tyler

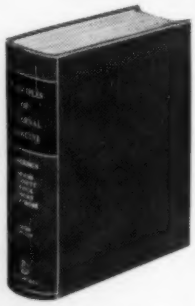
696 **A Psychodynamic Study of Medical Students and Their Adaptational Problems: Preliminary Report**
Harold I. Lief, Kathleen Young, Vann Spruiell, Robert Lancaster, and Victor F. Lief

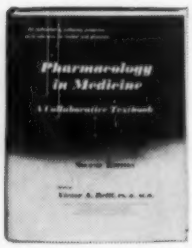
705 **Medical Education Forum; Abstracts from the World of Medical Education; New Books**

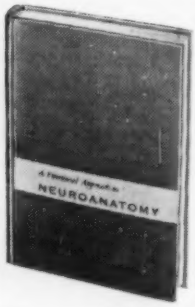
xviii **News in Brief**

NEW (12th) Edition! | **Greenhill—OBSTETRICS**

See Saunders advertisement just inside ⇨







4 books designed to meet the needs of the student—

PRINCIPLES OF INTERNAL MEDICINE

Third Edition

Edited by T. R. Harrison, M.D., R. D. Adams, M.D., I. L. Bennett, Jr., M.D., W. H. Resnik, M.D., G. W. Thorn, M.D., M. M. Wintrobe, M.D., 1782 pp., plus index, 7½×10, $18.50

This widely adopted work follows the modern trend in medicine by dealing with disease entities in the light of their symptomatology, abnormal physiology, pathology, chemistry, and psychology. In this work information is presented from the standpoint of the patient's symptoms as they are presented to you.

PHARMACOLOGY IN MEDICINE

Second Edition

Edited by Victor A. Drill, M.D., Ph.D., with 85 noted contributors, 1273 pp., 8½×11, illus., $19.50

This work deals with those drugs currently in practical use with emphasis on their mechanism of action, effect within the body, therapeutic value, and available forms. The 2nd Edition continues as a collaborative volume with each chapter authored by an outstanding pharmacologist-teacher who is engaged in active research on the drugs about which he writes.

A FUNCTIONAL APPROACH TO NEUROANATOMY

By Earl Lawrence House, Ph.D., and Ben Pansky, Ph.D., 494 pp., 7¼×9⅞, 360 illus., including an atlas of brain sections, $12.50

This volume is prepared with the needs of the medical student continually in mind. It presents basic neuroanatomy in a stimulating fashion. Using a functional yet systematic approach, the authors integrate clinical considerations into practically every chapter, including testing and symptoms of neurologic disorders.

PRINCIPLES OF BIOCHEMISTRY

Second Edition

By A. White, Ph.D.; P. Handler, Ph.D.; E. Smith, Ph.D.; D. Stetten, Jr., M.D., Ph.D.; 1149 pp., 6×9, illus., $15.00

This work emphasizes the fundamental principles and concepts of biochemistry with consideration to the mechanism of, and factors influencing, biological reactions where they are known. Chapters on metabolism and endocrinology have been completely rewritten in line with the rapid advances in these fields.

The Blakiston Division • McGRAW-HILL BOOK CO.
330 W. 42nd Street — 68 Post Street
New York 36, N.Y. — San Francisco, Calif.

Latest Editions of Popular Texts from SAUNDERS

New (18th) Edition—Ruch & Fulton's MEDICAL PHYSIOLOGY & BIOPHYSICS

Well known in previous editions as *Fulton's Physiology*, this *New (18th) Edition* is up to the moment with its new title, new content and new editorial team. All chapters have been thoroughly reviewed to incorporate latest concepts. Two new chapters, one on the biophysics of the cell membrane, and one on the neurophysiology of emotion, illustrate how this revision takes in the broader scope of today's expanded study of physiology. Nearly all the chapters on nerves, blood, hemodynamics, the cardiac cycle, the electrocardiogram and control of cardiac output, and respiration are completely new or rewritten. Be sure to see this up-to-date volume before recommending a physiology text.

Edited by THEODORE C. RUCH, Ph.D., Professor and Executive Officer, Department of Physiology and Biophysics, University of Washington School of Medicine; and JOHN F. FULTON, M.D., Sterling Professor of the History of Medicine, Yale University School of Medicine; with the collaboration of 22 authorities. About 1122 pages, 6½" × 10", with 616 illustrations. About $16.00. *New (18th) Edition—Ready July, 1960.*

New (7th) Edition—Davis-Christopher's TEXTBOOK of SURGERY

Dr. Loyal Davis and 82 eminent teachers—comprising a virtual "Who's Who" in surgery—have extensively revised this long-famous student text to bring it right up to the minute. They cover every common surgical disease—its etiology, pathology, clinical course, diagnosis, techniques of treatment, pre- and postoperative care, complications, and prognosis. Unusual features of the text include an introductory *History of Surgery*, and concluding chapters on *The Qualifications of the Surgeon* and *Surgical Judgment*. Among the nine new or completely rewritten sections are those on: Infections (including hospital staph infection)—The Foot—Surgery of Peptic Ulcer—Urinary System—Amputations—etc.

Edited by LOYAL DAVIS, M.D., Professor and Chairman of the Department of Surgery, Northwestern University Medical School. With the Collaboration of 82 American Authorities. 1551 pages, 7" × 10", with 1597 illustrations on 810 figures. $17.00. *New(7th) Edition!*

New (12th) Edition—Greenhill's OBSTETRICS

23 distinguished contributors have been brought into the *New (12th) Edition* of this famous text, to keep it in the forefront of the striking advances in the endocrinologic, nutritional, psychologic, and other aspects of obstetrics. Every facet is covered, from physiology to detailed medical treatment and surgical intervention. You will find a truly graphic description of the clinical course and conduct of labor—making each step in delivery strikingly clear. Every page of the text was rewritten, many of the older illustrations discarded and 162 new ones added, particularly in the section on repair problems. This is one of the most modern and up-to-date textbooks in obstetrics now available.

By J. P. GREENHILL, M.D., Senior Attending Obstetrician and Gynecologist, The Michael Reese Hospital; Obstetrician and Gynecologist, Associate Staff, The Chicago Lying-in Hospital; Attending Gynecologist, The Cook County Hospital; Professor of Gynecology, Cook County Graduate School of Medicine. About 1184 pages, 7" × 10", with about 903 illustrations. About $17.00. *New (12th) Edition—Ready August!*

Gladly Sent To Teachers For Consideration As Texts

W. B. SAUNDERS COMPANY

West Washington Square **Philadelphia 5, Pa.**

THE JOURNAL OF MEDICAL EDUCATION

Official Publication of the Association of American Medical Colleges

EDITORIAL OFFICE

University Hospitals, School of Medicine, University of Wisconsin, Madison 6, Wisconsin, ALpine 6-6811

JOHN Z. BOWERS, *Editor-in-Chief*

ELIZABETH B. POHLE, *Assistant Editor*

OFFICE OF THE ASSOCIATION OF AMERICAN MEDICAL COLLEGES

2530 Ridge Avenue, Evanston, Illinois, DAvis 8-9505

NEVA V. RESEK, *News Editor*

HELEN CLAIRE HERMAN, *Advertising*

EDITORIAL BOARD

JOHN Z. BOWERS, *Chairman*

STANLEY E. BRADLEY	T. HALE HAM	VERNON W. LIPPARD
JOHN A. D. COOPER	GEORGE HARRELL	WILLIAM F. NORWOOD
JULIUS H. COMROE, JR.	WILLIAM N. HUBBARD, JR.	KENNETH E. PENROD

INFORMATION FOR SUBSCRIBERS

The Journal of Medical Education is owned by the Association of American Medical Colleges and published monthly by the University of Chicago Press, 5750 Ellis Avenue, Chicago 37, Illinois. Second-class postage paid at Chicago, Illinois.

Subscription Rates: $7.00 per year, $13.50 two years, $19.50 three years, $1.00 per single copy; foreign, $8.00 per year, $15.50 two years, $22.50 three years, $1.25 per single copy; Pan America and Canada, $7.50 per year, $14.50 two years, $21.00 three years. Supplements, $2.00.

Copyright July 1960 by the Association of American Medical Colleges.

INFORMATION FOR CONTRIBUTORS

The Journal of Medical Education serves as an international medium for the exchange of ideas in medical education, as well as a means of communicating the policies, programs, and problems of the Association. The Editorial Board welcomes the submission of manuscripts concerned with the broad field of medical education; this includes preparation for medical education; the medical school experience; intern and resident education; graduate and postgraduate medical education. The Editorial Board recognizes that medical education includes the activities of faculty, students, administrators, and those of the practicing profession who also teach and learn. Thus, it invites communications from any of these sources.

Manuscripts should be submitted in duplicate. All manuscripts are reviewed by the Editorial Board before acceptance for publication. All copy, including footnotes, tables, and legends, should be typed double-spaced. Each diagram or graph or photograph should have a brief legend. Each table should be typed on a separate sheet of paper. References should refer to published material only, must be submitted in alphabetical order, and should include, in order: author, title, journal abbreviation (*Quarterly Cumulative Index Medicus* form), volume number, page, and year; book references should also include editors, edition, publisher, and place of publication.

Galley proofs will be mailed to authors for correction before publication and should be returned within 48 hours after receipt.

Reprints may be ordered, when galley proofs are returned, from the University of Chicago Press, in multiples of 50, at a price depending on the length of the article; prices are listed on the reprint order form.

Medical Education Forum includes editorials, letters, comments, criticisms, and excerpts from important addresses.

News from the Medical Schools: Material for this section should be transmitted to the News Editor, Miss Neva Resek, 2530 Ridge Avenue, Evanston, Illinois. Announcements of major faculty and administrative appointments, news of distinguished visitors and significant educational developments will be included. It is not possible to publish notices on grants-in-aid for scientific research.

Items of Current Interest: Audio-visual news and notices from national and federal agencies appear in this section.

CORRESPONDENCE

Address all correspondence regarding manuscripts, editorials, and letters to the Editor to the Editorial Office, University Hospitals, University of Wisconsin, Madison 6, Wisconsin.

Address all correspondence concerning reprints to the University of Chicago Press, 5750 Ellis Avenue, Chicago 37, Illinois. Address all correspondence concerning subscriptions, change of address, and back numbers to the Association of American Medical Colleges, 2530 Ridge Ave., Evanston, Ill. All changes of address should provide both the old and the new address.

Address all correspondence concerning news, announcements, and personnel exchange to the office of the Association of American Medical Colleges, % Miss Neva Resek, 2530 Ridge Avenue, Evanston, Illinois; address all correspondence concerning advertising to Miss Helen Claire Herman, 2530 Ridge Avenue, Evanston, Illinois.

PRINTED IN U.S.A.

PRACTICAL CLINICAL MANAGEMENT OF ELECTROLYTE DISORDERS

(New Book—June 1960)

By **William J. Grace**, M.D.
(Prof. of Clin. Medicine, N.Y. University)

This small book is a guide to the bedside clinical management of electrolyte problems. It describes the clinical syndromes of electrolyte disturbances, briefly explains the mechanisms involved and specifies what can be done to correct them. In this respect it differs from other texts which are physiologically and chemically oriented and is therefore of practical usefulness to students, house officers and physicians. Illustrative case reports supplement the text.

June 1960 • 144 pages • 11 illustrations • $4.95

YATER'S

SYMPTOM DIAGNOSIS

(5th Ed.—July 1960)

By **Wallace M. Yater**, M.D.
and **William Francis Oliver**, M.D.

With new material added, extensive rewriting and thorough revision Yater's *Symptom Diagnosis* is again up to date. Tens of thousands of physicians have depended upon it for practical help in diagnosis and differential diagnosis. Following a brief description of a symptom the authors list, in the order of their importance, the diseases in which the symptom is dominant or a constant finding. Both symptoms and diseases are indexed.

5th Ed. • July 1960 • 920 pages • About $15.00

GALLAGHER'S

MEDICAL CARE OF THE ADOLESCENT

(New Book—March 1960)

By **J. Roswell Gallagher**, M.D.
Adolescent Unit, Children's Hospital, Boston

This is the first complete and authoritative book to discuss those ailments which are common during the adolescent period or which present some peculiarity for the 12 to 21 age group. It stresses the importance of properly evaluating the characteristics, developmental and emotional problems of adolescents and presents effective technics for prevention, diagnosis, treatment and general patient care.

March 1960 • 384 pages • 43 Illus. • $10.00

1960 EDITION
COLE & PUESTOW'S

FIRST AID: DIAGNOSIS AND MANAGEMENT

(5th Ed.—March 1960)

By **Warren H. Cole**, M.D., F.A.C.S.
and **Charles B. Puestow**, M.D., F.A.C.S.
With 16 collaborating Authors

This comprehensive and authoritative manual should be available to all physicians, medical students, individuals concerned with civilian defense programs and members of all aid or rescue squads. It is indispensable for industrial aid stations and in the emergency rooms of hospitals. In this rewritten and revised edition there is one new chapter "Injuries of the Hand" and many new illustrations.

432 Pages • 217 Illus. • $6.25

COLOR ATLAS AND MANAGEMENT OF VASCULAR DISEASE

(New Book—Aug. 1959)

By **William T. Foley**, M.D.
and **Irving S. Wright**, M.D.
Vascular Disease Clinic, New York Hospital

194 illustrations, mostly enlargements of four-color transparencies, illustrate 94 cases of vascular disease. Text includes brief case histories, discussion of type of case and explanation of the authors' points of view on diagnosis, pathogenesis and conservative treatment. These selected cases cover arterial and venous diseases; lymphedema; vasospasm; aneurism; minute vessel diseases; and blood vessel tumors. Index and references included.

225 Pages • 194 Illus., 166 in color • $18.00

For Sale at all Bookstores or

APPLETON-CENTURY-CROFTS, INC., 35 W. 32nd St., N.Y. 1, N.Y.

NEW!

Bausch & Lomb SPECTRONIC 505* Recording Spectrophotometer

... less than half the cost of other recording spectrophotometers!

$3685 VISIBLE RANGE

(UV-VISIBLE, $4285)

See the revolutionary new instrument that directly records transmittance, absorbance, reflectance and emission in UV and visible ranges ...

with an exclusive electronic sensor that automatically adjusts drum speed to variations in curve complexity ... featuring B&L Certified-Precision Gratings.

Only 36" x 22" x 15", it's as streamlined as the universally accepted B&L Spectronic 20* Colorimeter ...

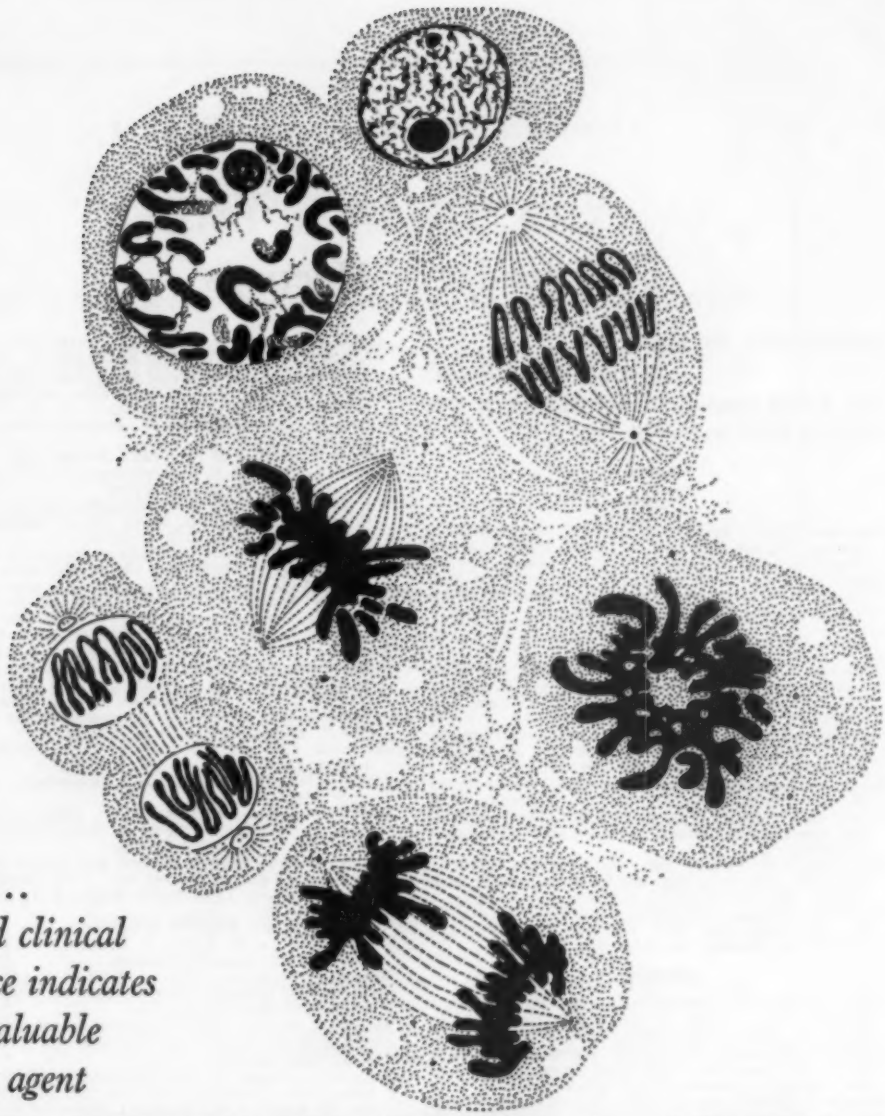
with a complete line of accessories including an exclusive new air-cooled Hydrogen lamp ...

at less than half the cost of other recording spectrophotometers.

*Trademark, Bausch & Lomb

WRITE for your copy of Catalog D-2009,
Bausch & Lomb
14707 Bausch Street, Rochester 2, N. Y.

BAUSCH & LOMB
SINCE 1853



new evidence... continued clinical experience indicates it as a valuable cytotoxic agent

CYTOXAN®

Cyclophosphamide, Mead Johnson

FOR PALLIATIVE CHEMOTHERAPY OF CERTAIN TYPES OF MALIGNANT NEOPLASMS

Report from a recent comparative clinical evaluation of two alkylating agents: "With the use of cyclophosphamide [Cytoxan], there is a relative lack of thrombocytopenia and a diminution in gastrointestinal side-effects, so that it may offer therapeutic advantages over other alkylating agents."*

Other Advantages in Clinical Practice: Broad spectrum of application • High therapeutic index • No vesicant activity—may be given orally or parenterally.

For a copy of the Cytoxan brochure, or other additional information on Cytoxan, communicate directly with the Medical Department (Section C), Mead Johnson & Company, Evansville 21, Indiana.

*Papac, R.; Petrakis, N. L.; Amini, E, and Wood, D. A.: J.A.M.A. *172*:1387-1391 (March 26) 1960.

Mead Johnson
Symbol of service in medicine

11260

Calendar of Meetings

ASSOCIATION OF AMERICAN MEDICAL COLLEGES

71st Annual Meeting, October 31–Nov. 2, 1960
Diplomat Hotel, Hollywood, Fla.

1960

JULY

AMERICAN GOITER ASSOCIATION, Royal College of Surgeons, London, England, July 5–9. Dr. John C. McClintock, 149½ Washington Ave., Albany 10, N.Y. Secretary.

AMERICAN SOCIETY OF FACIAL PLASTIC SURGERY, Hotel Elysee, New York City, July 22. Dr. Samuel M. Bloom, 123 E. 83d St., New York 28, Secretary.

AUGUST

AMERICAN CONGRESS OF PHYSICAL MEDICINE AND REHABILITATION, Mayflower Hotel, Washington, D.C. Aug. 21–26. Mrs. Dorothea C. Augustin, 30 N. Michigan Ave., Chicago 2, Executive Secretary.

AMERICAN HOSPITAL ASSOCIATION, Civic Auditorium, San Francisco, Aug. 27–Sept. 1. Mr. Maurice J. Norby, 18 E. Division St., Chicago, Assistant Director.

CONFERENCE ON THE CHEMICAL ORGANIZATION OF CELLS: NORMAL AND ABNORMAL, University of Wisconsin, Madison, Aug. 25–27. Dr. J. F. A. McManus, Dept. of Pathology, University of Alabama Medical Center, Birmingham, Chairman.

GERONTOLOGICAL SOCIETY, INC., Mark Hopkins Hotel, San Francisco, Aug. 7–12. Mrs. Marjorie Adler, 660 S. Kingshighway Blvd., St. Louis 10, Administrative Secretary.

NATIONAL MEDICAL ASSOCIATION, INC., Penn-Sheraton Hotel, Pittsburgh, Aug. 8–11. Dr. John T. Givens, 1108 Church St., Norfolk, Va., Executive Secretary.

SEPTEMBER

AMERICAN MEDICAL WRITERS' ASSOCIATION, Hotel Morrison, Chicago, Sept. 30–Oct. 1. Dr. Harold Swanberg, 510 Maine St., Quincy, Ill., Secretary.

AMERICAN ROENTGEN RAY SOCIETY, Ambassador Hotel, Atlantic City, Sept. 27–30. Mr. Hugh Jones, 20 N. Wacker Dr., Chicago 6, Director, Public Relations.

AMERICAN SOCIETY OF CLINICAL PATHOLOGISTS, Palmer House, Chicago, Sept. 24–Oct. 2. Mr. Claude E. Wells, 445 Lake Shore Drive, Chicago 11, Executive Secretary.

COLLEGE OF AMERICAN PATHOLOGISTS, Palmer House, Chicago, Sept. 24– 27. Dr. Arthur H. Dearing, 2115 Prudential Plaza, Chicago, Executive Director.

NATIONAL CANCER CONFERENCE, AMERICAN CANCER SOCIETY, INC., AND THE NATIONAL CANCER INSTITUTE, Minneapolis, Minnesota, Sept. 13–15. Dr. Roald M. Grant, 521 W. 57th St., New York 19, Coordinator.

OCTOBER

ACADEMY OF PSYCHOSOMATIC MEDICINE, Benjamin Franklin Hotel, Philadelphia, Oct. 13–15. For information write Dr. Bertram B. Moss, 55 E. Washington, Chicago 2.

AMERICAN ACADEMY FOR CEREBRAL PALSY, Penn-Sheraton Hotel, Pittsburgh, Oct. 5–8. Dr. Joseph D. Russ, 1520 Louisiana Ave., New Orleans 15, Executive Secretary.

AMERICAN ACADEMY OF OPHTHALMOLOGY & OTOLARYNGOLOGY, Palmer House, Chicago, Oct. 9–14. Dr. William L. Benedict, 15 Second St., S.W., Rochester, Minn., Executive Secretary.

AMERICAN ACADEMY OF PEDIATRICS, Palmer House, Chicago, Oct. 17–20. Dr. E. H. Christopherson, 1801 Hinman Ave., Evanston, Ill., Executive Director.

AMERICAN ASSOCIATION OF MEDICAL CLINICS, New Orleans, Oct. 6–8. Dr. Joseph B. Davis, 134 N. Washington St., Marion, Ind., Secretary.

AMERICAN ASSOCIATION OF MEDICAL RECORD LIBRARIANS, Olympia Hotel, Seattle, Oct. 10–13. Miss Doris Gleason, 840 N. Lake Shore Dr., Chicago 11, Executive Director.

AMERICAN ASSOCIATION FOR THE SURGERY OF TRAUMA, Coronado Hotel, Coronado, Calif., Oct. 5–7. Dr. William T. Fitts, Jr., 3400 Spruce St., Philadelphia 4, Secretary.

AMERICAN COLLEGE OF GASTROENTEROLOGY, Bellevue-Stratford Hotel, Philadelphia, Oct. 23–26. Mr. Daniel Weiss, 33 W. 60th St., New York 23, Executive Director.

AMERICAN COLLEGE OF SURGEONS, Clinical Congress, San Francisco, Oct. 10–14. For information write: Dr. William E. Adams, 40 E. Erie St., Chicago 11.

AMERICAN FRACTURE ASSOCIATION, El Presidentia Hotel, Mexico, D. F., Mexico, Oct. 30–Nov. 4. Dr. H. W. Wellmerling 610 Griesheim Bldg., Bloomington, Ill., Executive Secretary.

AMERICAN HEART ASSOCIATION, INC., Jefferson Hotel, St. Louis, Oct. 21–25. Mr. Rome A. Betts, 44 E. 23rd St., New York 10, Executive Director.

AMERICAN OTORHINOLOGIC SOCIETY FOR PLASTIC SURGERY, INC., Conrad Hilton, Chicago, Oct. 9. Dr. Joseph G. Gilbert, 75 Barberry Lane, Roslyn Heights L. I., New York, Secretary.

AMERICAN PUBLIC HEALTH ASSOCIATION, San Francisco, Oct. 31–Nov. 4. Dr. Berwyn F. Mattison, 1790 Broadway, New York 19, Executive Director.

AMERICAN RHINOLOGIC SOCIETY, Belmont Hotel, Chicago, Oct. 8. Dr. Robert M. Hansen, 1735 N. Wheeler Ave., Portland 17, Ore., Secretary.

AMERICAN SCHOOL HEALTH ASSOCIATION, San Francisco, Oct. 30–Nov. 4. Dr. A. O. DeWeese, 515 E. Main St., Kent, Ohio, Executive Secretary.

AMERICAN SOCIETY OF ANESTHESIOLOGISTS, INC., Statler-Hilton, New York City, Oct. 2–7. Mr. John W. Andes, 188 W. Randolph St., Chicago 1, Executive Secretary.

AMERICAN SOCIETY OF FACIAL PLASTIC SURGERY, Chicago, Oct. 13. Dr. Samuel M. Bloom, 123 E. 83d St., New York 28, Secretary.

AMERICAN SOCIETY OF PLASTIC AND RECONSTRUCTIVE SURGERY, Statler Hotel, Los Angeles, Oct. 2–7. Dr. Thomas R. Broadbent, 508 E. S. Temple, Salt Lake City, Secretary.

ASSOCIATION OF MILITARY SURGEONS OF THE UNITED STATES, Mayflower Hotel, Washington, D.C., Oct. 31–Nov. 2. Lt. Col. George M. Beam, AUS Retired, 1726 Eye St., N.W., Washington 6, D.C.

INTERSTATE POSTGRADUATE MEDICAL ASSOCIATION OF NORTH AMERICA, Pittsburgh-Hilton Hotel, Pittsburgh, Oct. 31–Nov. 3. Mr. Roy T. Ragatz, Box 1109, Madison 1 Wis., Executive Director.

1174 Illustrations, Mostly in Color!

GRAY'S ANATOMY

Lea & Febiger is proud to present the fully up to date

AMERICAN CENTENNIAL (27th) EDITION

Scores of new features. Many sections rewritten. New illustrations. New Paris Nomenclature. Up to date in every respect. All familiar aspects of Gray retained. Unsurpassed in arrangement and clarity. Unquestioned in authority.

Anatomy of the Human Body. By HENRY GRAY, F.R.S. Edited by CHARLES MAYO GOSS, M.D., Managing Editor of *Anatomical Record;* Professor and Head of the Department of Anatomy, Louisiana State University, New Orleans. *1458 pages, 7" × 10". 1174 illustrations, mostly in color. New 27th (American Centennial) edition. $17.50.*

The Ideal Review Book for the September 7–8 National Board Examinations!

JOHNSTON—A SYNOPSIS OF REGIONAL ANATOMY

Dr. Johnston's book offers a thorough review of anatomy for those who have already studied the subject with the aid of a standard text and have had dissecting room experience. "Of particular value to medical students."—*Medical Education.*

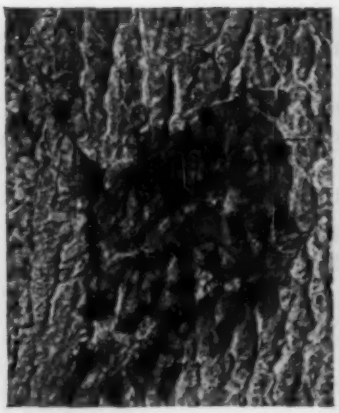
A Synopsis of Regional Anatomy. By T. B. JOHNSTON, C.B.E., M.D., Emeritus Professor of Anatomy, University of London, Guy's Hospital Medical School. 450 pages, 5¼" × 7¾". 20 plates and 19 text figures. 8th edition. $6.00.

Washington Square

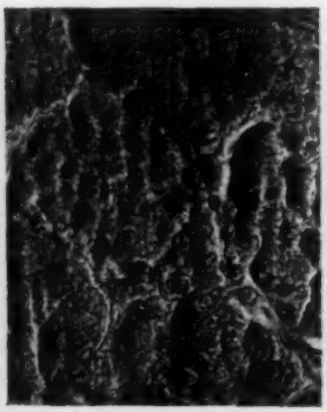
LEA & FEBIGER

Philadelphia 6 Pennsylvania

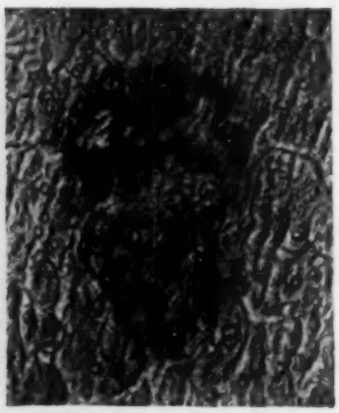
Prescribe enough Orinase* to release enough native insulin



Before:
Microphotograph showing insulin granules in beta cells of pancreas of normal dog.



During:
Degranulation following administration of Orinase. Note complete release of native insulin.



After:
Regeneration of granules following termination of Orinase dosage.

Adjust Orinase dosage to make available the amount of native insulin *needed* by the diabetic patient. This may be done freely because Orinase has virtually no "ceiling" imposed on dosage by toxicity or untoward effects.

In a series of 187 diabetic patients successfully managed on Orinase (tolbutamide) during a period of 6 to 30 months, the reported[1] distribution of daily doses was as follows: 1 gram, 17%; 1.5 grams, 22%; 2 grams, 40%; 3 grams, 21%.

Similarly, in three years' clinical experience with a population of approximately 3,000 diabetics on Orinase, it has been observed that about one-third of the patients at any one time require and receive dosages of 2 to 3 grams a day for successful management.[2]

To obtain optimum control, and avoid needless "secondary failures"—give sufficient Orinase to meet varying requirements from patient to patient or in a given patient from time to time.

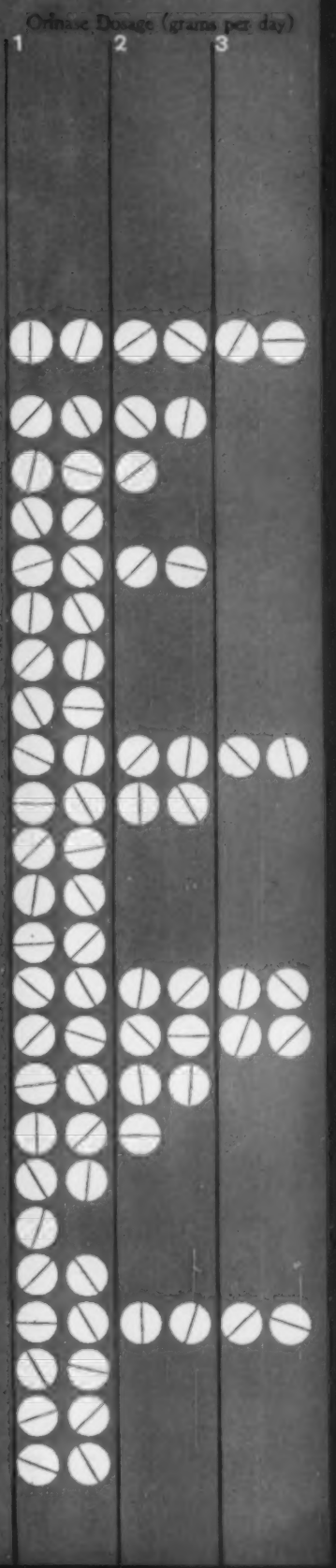
1. Gorman, C. K., and Weaver, J. A.: Brit. M. J. 2:1214 (Dec. 5) 1959.
2. Case data courtesy Henry Dolger, M.D.

*TRADEMARK, REG. U. S. PAT. OFF.—TOLBUTAMIDE, UPJOHN

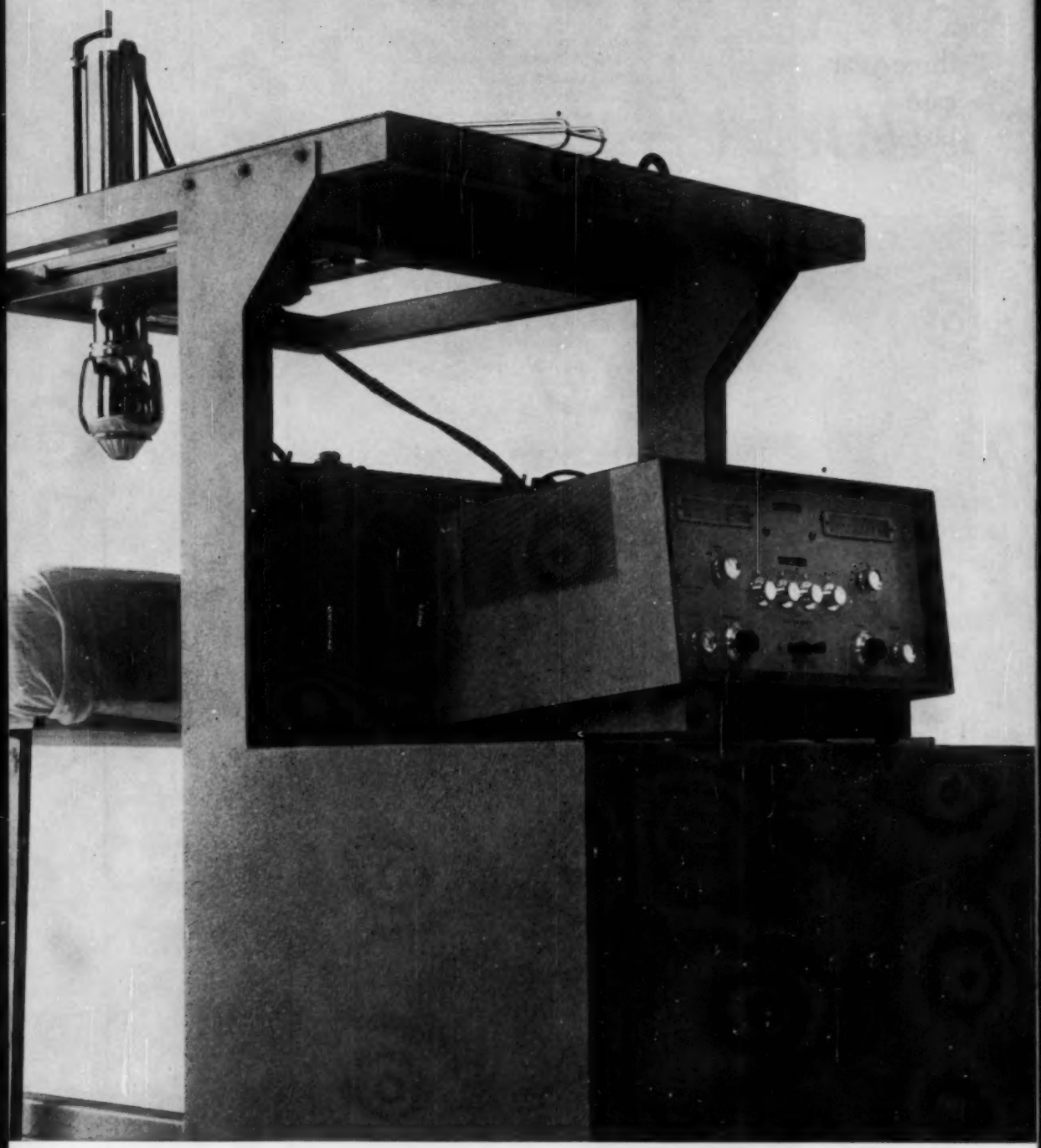
Upjohn THE UPJOHN COMPANY KALAMAZOO, MICHIGAN

a three-year case history[2]

Date	Entries and Comments
6/21/56	Mr. J. S., 54 yrs. old, diabetes mellitus 1½ yrs. F. H.—neg. for diabetes. P. H.—surg. 0, med. 0. Restaurant manager—M., 3 children living and well. Wt. 155 lb. 1 yr. ago; now 125. P. I.—onset 1½ yrs. ago with thirst and polyuria; glycosuria found. On diet. In past year lost 30 lb., strict diet—all kinds of dietetic substitutes. Some asthenia. Afraid of insulin. No recent glycosuria or nocturia. P. Exam.—thin male. Fundi neg. ENT neg. BP 140/80. Heart and lungs neg. Extremities: poor pulses. Urine—sugar 0, acetone 0. Noon blood sugar 240. Rx more adequate diet and Orinase 3 Gm.
7/9/56	Wt. 127, urine 0-0. B. S. 110, occ. nocturia but no glycosuria. Rx: eat more; Orinase 2 Gm.
8/29/56	Wt. 159½, urine 0-0-0. B. S. 205. Rx 1.5 Gm.
10/1/56	Wt. 143, urine 0-0-0. B. S. 125. Rx 1 Gm.
11/5/56	Wt. 148, urine 4+ -0-0, noon B. S. 160. Rx 2 Gm.
12/7/56	Wt. 146, urine 0-0-0, noon B. S. 120. Rx 1 Gm.
1/11/57	Wt. 144½, urine 0-0-0, noon B. S. 150. Rx 1 Gm.
2/11/57	Wt. 144½, urine 0-0, noon B. S. 120. Rx 1 Gm.
5/10/57	Wt. 140½, urine 4+ -0-0. B. S. 275. Rx 3 Gm.
6/12/57	Wt. 138½, urine 0-0-0, noon B. S. 114. Rx 2 Gm.
8/7/57	Wt. 136½, urine 0-0-0. B. S. 160. Rx 1 Gm.
10/2/57	Wt. 136½, urine 0-0-0. B. S. 86. Rx 1 Gm.
11/29/57	Wt. 136½, urine 0-0-0. B. S. 125. Rx 1 Gm.
1/17/58	Wt. 134½, urine 4+ -0-0. B. S. 216. Rx 3 Gm.
2/14/58	Wt. 132, urine 0-0-0. B. S. 135. Rx 3 Gm.
3/28/58	Wt. 136½, urine 0-0-0, noon B. S. 95. Rx 2 Gm.
5/5/58	Wt. 138, urine 0-0-0. B. S. 112. Rx 1.5 Gm.
6/16/58	Wt. 137, urine 0-0-0. B. S. 93. Rx 1 Gm.
8/11/58	Wt. 138, urine 0-0-0, noon B. S. 132. Rx 0.5 Gm.
10/20/58	Wt. 134, urine 3+ -0-0. B. S. 220. Rx 1 Gm.
11/24/58	Wt. 131½, urine trace -0-0. B. S. 251. Rx 3 Gm.
2/18/59	Wt. 134, urine 0-0-0. B. S. 120. Rx 1 Gm.
4/9/59	Wt. 137½, urine 0-0-0. B. S. normal. Rx 1 Gm.
6/5/59	Wt. 138, urine 0-0-0. B. S. normal. Rx 1 Gm.



Now! An Improved Isotope Scanner



Complete scanning system includes 1700A Isotope Scanner, DS5-1P Scintillation Detector with straight bore and focused collimator inserts, and 132A combination Spectrometer-Scaler.

from Nuclear-Chicago

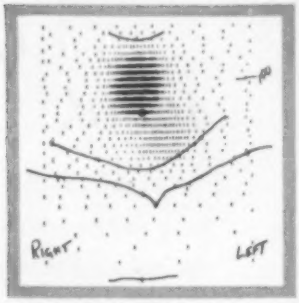
New Model 1700A Scanner holds scintillation detectors weighing up to 125 pounds!

The clinical demand for radioactivity scanners with increased sensitivity has been met with the new 1700A Isotope Scanner. A new strengthened scanning mechanism, exclusive with Nuclear-Chicago, will support scintillation detectors weighing up to 125 lbs. Now, for the first time, physicians can take advantage of the increased speed of scanning, sensitivity, and resolution offered by heavily collimated scintillation detectors with 3" crystals.

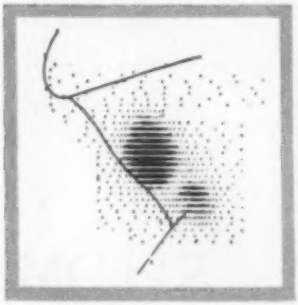
And, the Nuclear-Chicago Isotope Scanner is still the standard of the industry. It can be used with any scintillation detector and scaler. It can be supplied with a combination spectrometer-scaler (the only really valid and safe way to "erase" background and eliminate scatter because even the weakest isotope concentration cannot be erased). It occupies a floor space of only 34" x 44", is extremely simple and sturdy in construction. A complete system is most modestly priced, and the scaler and detector are easily removed from the scanner for other purposes when the scanner is idle.

Our General Catalog R fully describes the 1700A Isotope Scanner and we have printed a brochure containing 30 actual scans made by users of this equipment. Please write for your copies.

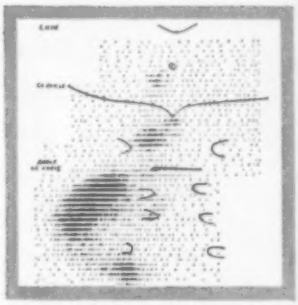
Actual scans below illustrate typical diagnostic uses of the 1700A Isotope Scanner. Top three scans, made using Spectrometer-Scaler, show how scatter and background are reduced.



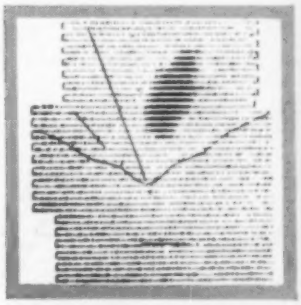
Thyroidectomy in 1928. Thyrotoxic symptoms in 1956. Scan shows recurrence in pyramidal region.



Same patient as top scan. Left lateral view. Gamma-ray Spectrometer used for background reduction.



Intrathoracic recurrence 20 years after surgery. Gamma-ray Spectrometer used with Scaler.



Scan showing residual thyroid area following surgery and node dissection. Spectrometer not used.

nuclear-chicago
CORPORATION
315 E. HOWARD AVE., DES PLAINES, ILLINOIS

Special combination price on two basic student texts . . .

Grant's ATLAS OF ANATOMY, *4th ed.*

"As this excellent and well-known atlas has been revised and improved, it has become more and more complete and consequently more valuable as an atlas. In this fourth edition, the inclusion of more than eighty new illustrations and an improvement of many of the old illustrations has done much to perfect an atlas which was already very good. . . . The text is concise and easy for students to follow. The numerous colored illustrations greatly enhance the atlas. . . . This atlas will not need to be recommended to medical students because they will discover it and use it entirely on their own. It will be particularly good for beginning students."—*Frank J. Figge in J. Med. Educ.*

1956 • 577 pp., 714 figs. • Regular price: $15.00

STEDMAN'S MEDICAL DICTIONARY, *19th ed.*

". . . a solid and well-fashioned tool of medical talk, medical writing and even medical thinking" (*J. M. Soc. New Jersey*). ". . . splendid format, including clear type and sufficient spacing to locate definitions easily" (*South. M. J.*). ". . . wealth of definitions, clearly and cleanly stated" (*Northwest Med.*). "Especially useful is the nomenclature appendix, giving in parallel columns anatomic terms in English, Latin, and BNA (Basle) form, together with revisions adopted in 1955" (*J. Am. M. Women's A.*).

1957 • 1700 pp., 23 pls., many figs. • Regular price: $12.50

SPECIAL COMBINATION PRICE: $25.00. A SAVING OF $2.50!

Baltimore 2, Maryland

baby boom–

will they all be well nourished?

As use of prepared formulas to supplement or replace breast milk increases, you will seek a formula that approximates human milk in optimal content of fats, proteins, carbohydrate, vitamins and minerals. In S-M-A you will find a formula that meets all known infant nutritional needs to promote sound health and physiologic growth—a formula on which babies thrive.

S-M-A was the first formula in which cows' milk fat was successfully replaced by fats patterned after human milk—the first to receive the "Seal of Acceptance" of the A.M.A. Council on Foods and Nutrition—the first to contain vitamins A and D—the first liquid infant formula in which ascorbic acid was successfully stabilized, thus eliminating the need for supplementary vitamin C.

S-M-A, the first infant formula successfully patterned after human milk, is constantly improved as knowledge of infant nutrition advances.

The protein and amino acid contents of S-M-A are like those of breast milk. As with breast milk fat, S-M-A fat is high in essential unsaturated fatty acids, an important factor in reducing the incidence of eczema. The physiologic sugar, lactose, the only carbohydrate in S-M-A, minimizes perianal dermatitis and aids growth of favorable lactobacilli intestinal flora. S-M-A forms a soft, flocculent curd that rivals the curd of human milk in digestibility and helps protect against colic and regurgitation.

For further information and as a helpful teaching aid, we will gladly send you our physicians' handbook, "Modern Infant Feeding." Please write to Wyeth Laboratories, P. O. Box 8299, Philadelphia 1, Pa.

INSTANT POWDER CONCENTRATED LIQUID

S-M-A®

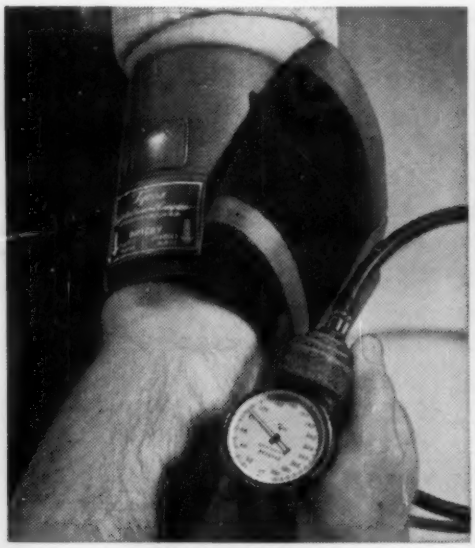
Food Formula for Infants
Unsurpassed in Nearness to Healthy Mother's Milk

100 Wyeth

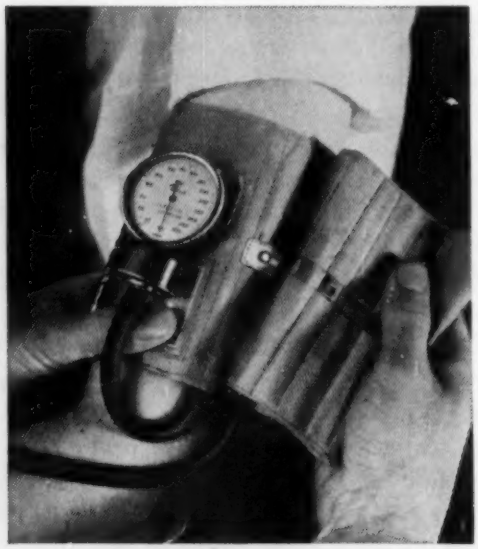
A Century of Service to Medicine

WHAT'S YOUR FAVORITE COMBO?

Choose your own best combination from these Tycos® Aneroids and Cuffs. Try both Tycos Hand and Pocket Aneroids with both Hook and Velcro Cuffs at your dealer. He'll be glad to help you determine which pair suits you best. Taylor Instrument Companies, Rochester, New York, and Toronto, Ontario.



Tycos Hand Model Aneroid is preferred by many doctors for house calls and office use. It is shown here with new Velcro fastener. Velcro's two nylon strips stick like a burr to a dog's coat but peel apart easily.



Tycos Pocket Model Aneroid shown here with regular hook cuff, is recommended for routine hospital use. Just circle adult arm once, hook it and it's on. The zipper case protects the instrument, fits any pocket.

#5098-V Tycos Hand Aneroid
$49.50

#5082 New Velcro Cuff
$8.00

#5090 Tycos Pocket Aneroid
$46.50

#5080 Standard Hook Cuff
$9.50

Taylor Instruments **MEAN ACCURACY FIRST**

The Journal of MEDICAL EDUCATION

VOLUME 35 • NUMBER 7 • JULY, 1960

Table of Contents

vi **Calendar of Meetings**

637 **A Retrospective Evaluation of Research in the Medical Curriculum**—Arthur Ebbert, Jr.

644 **The Teaching of Preventive Medicine Reflected by Results of National Board Examinations**—John P. Hubbard

652 **Objectives of Biostatistics Instruction in the Medical School**—Carl E. Hopkins

655 **Social and Preventive Medicine as an Undergraduate Academic Discipline in the University College of the West Indies**—R. John Gourlay

660 **Electronic Instrumentation in a Medical Physiology Laboratory—an Evaluation after 2 Years' Experience**—Clarence N. Peiss, Robert D. McCook, Allen A. Rovick, and Walter C. Randall

666 **Some Effects on the Clinical Faculty of a Critical Incident Study of the Performance of Students**—Frederick Herzberg, Scott Inkley, and William R. Adams

675 **Well Baby Clinics in the First-Year Medical Curriculum: The Family Medicine Course at the University of California at Los Angeles**—Arthur H. Parmelee, Jr., Lonis Liverman, Nathalie Kennedy, Miriam G. Wilson, and Justin D. Call

684 **Roswell Park Research Participation Summer Program: Implications for Professional Education**—Edwin A. Mirand, George E. Moore, and James T. Grace, Jr.

689 **Psychiatry—Inherited or Acquired Knowledge**—Edward A. Tyler

696 **A Psychodynamic Study of Medical Students and Their Adaptational Problems: Preliminary Report**—Harold I. Lief, Kathleen Young, Vann Spruiell, Robert Lancaster, and Victor F. Lief

705 **Medical Education Forum**

705 **Editorial: E.C.F.M.G.**—John Z. Bowers

707 **Datagrams**

709 **Report: Medical Education and Facilities in Fiji**—M. L. Riccitelli

712 **Communications: An Interdisciplinary Approach to the First Year Course in Psychiatry**—Louis D. Cohen

715 **Use of the Punch Card in Budget Control and Personnel Records in the Medical School**—Joseph K. Hill

716 **Erratum**

717 **Abstracts from the World of Medical Education**

723 **New Books**

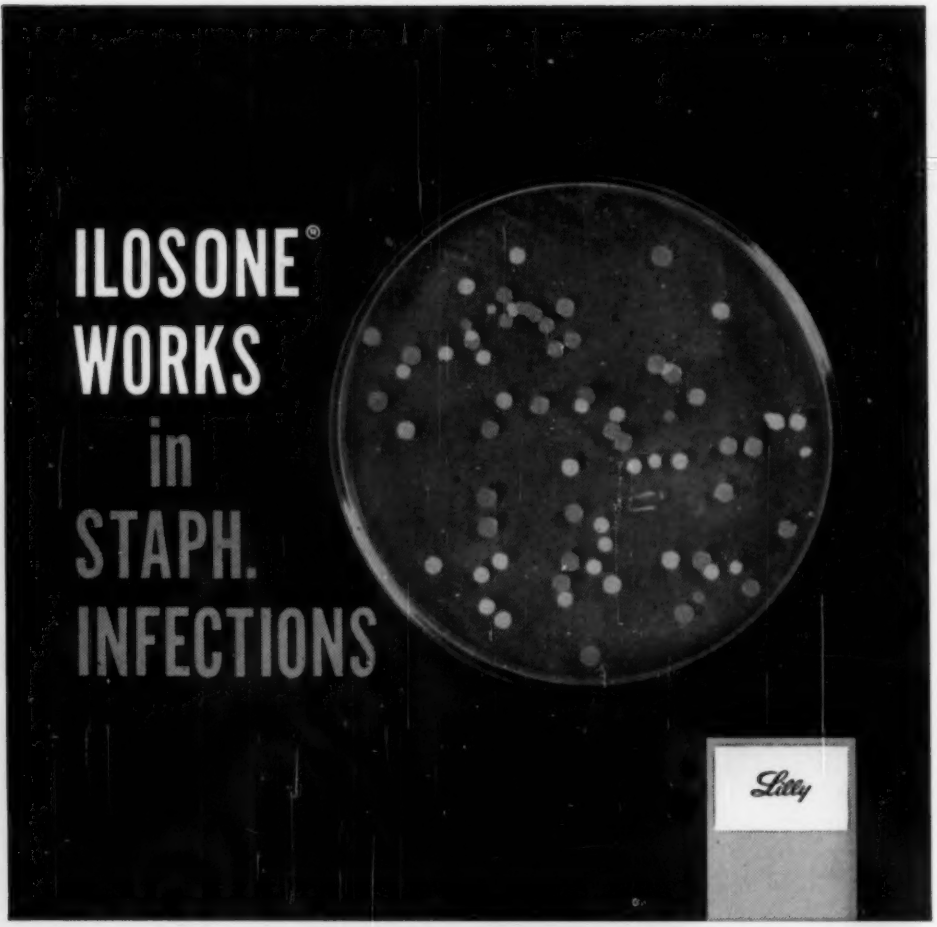
xviii **News in Brief**

xviii **News from the Medical Schools**

xxviii **Items of Current Interest**

xxxiv **Personnel Exchange**

xxxvi **Index to Advertisers**



"In our hands it has been particularly helpful in the treatment of staphylococcic disease."[1]

In difficult staph. infections, a decisive response may be obtained with Ilosone in a high percentage of cases.

In a study[1] of 105 patients, sixty-four of whom had *Staphylococcus aureus* infections, good results were obtained with Ilosone in 94 percent. Ten subjects had previously failed to respond to other forms of chemotherapy. The authors concluded that Ilosone ". . . is useful in treatment of a number of common infections and has been effective in treatment of a number of less common and more serious infections. . . . In our hands it has been particularly helpful in the treatment of staphylococcic disease."

Ilosone is available in **Pulvules®**, 125 mg. and 250 mg.; Lauryl Sulfate **125 Suspension,** 125 mg. (base equiv.) per 5-cc. tsp.; and Lauryl Sulfate **Drops,** 5 mg. (base equiv.) per drop. Usual dosage for adults and children over fifty pounds is 250 mg. every six hours.

1. Smith, I. M., and Soderstrom, W. H.: J. A. M. A., *170*:184 (May 9), 1959.

Ilosone® (propionyl erythromycin ester, Lilly)

ELI LILLY AND COMPANY • INDIANAPOLIS 6, INDIANA, U.S.A.

082535

The Journal of MEDICAL EDUCATION

VOLUME 35 • NUMBER 7 • JULY, 1960

A Retrospective Evaluation of Research in the Medical Curriculum*

ARTHUR EBBERT, JR., M.D.†

Yale University School of Medicine, New Haven, Connecticut

This study was initiated to provide data relative to (*a*) possible correlations between student research and the subsequent medical career and (*b*) the medical graduate's retrospective opinion of research as a requirement in the medical curriculum.

Student research is an integral part of the curriculum at the Yale School of Medicine; preparation of a dissertation based on research is a requirement for graduation. The student is expected to conceive his own problem and to select the faculty member with whom he will work. This step may be taken in the first, second, or third year. Investigation is carried out under supervision of the faculty adviser and usually in his own laboratory. The curriculum is arranged to provide unassigned periods in each of the four years which the student may devote to research or to a combination of research and elective courses. The completed thesis, approved by the faculty supervisor and the department chairman, is submitted in the spring of the senior year. Except for the years of World War II, this program in its present form and with only minor modifications has been in effect at Yale since 1925 (1).

The data for this study were obtained by a questionnaire mailed in February, 1959, to each living graduate for a 25-year period from 1928 through 1952. A total of 1206 graduates representing 26 classes was solicited. Replies were received from 1034 or 85.7 per cent. The range among the various classes was from 74 to 94 per cent.

The questionnaire was designed to obtain information in three general areas: (*a*) the present professional activities of the graduate, (*b*) the research undertaken as a medical student, and (*c*) the graduate's retrospective opinion of certain aspects of the research program. The author is cognizant of the limitations of data obtained by a mailed questionnaire. We are also well aware that various influences during and after medical school may significantly affect the material presented in this report.

It should be noted that because of World War II no research was required of graduates in the six classes[1] from 1943 through 1947. This group, which includes 276 of the replies, will be referred to as "war classes." The study is particularly concerned with the 758 replies from the classes of 1928–42 and 1948–52.

* This article is based on a paper presented at the 70th Annual Meeting of the Association of American Medical Colleges, Chicago, Illinois, November 3, 1959. The study was supported in part by the U.S. Public Health Service Experimental Training Grant Program.

† Assistant Dean and Assistant Professor of Medicine, Yale University School of Medicine, New Haven 11, Connecticut.

[1] Owing to the accelerated program of the war years two classes were graduated in 1946.

Of the 758 graduates in these classes, 46 per cent had done their research in the basic science departments, and 54 per cent in clinical departments. Pathology is included among the basic sciences. These two groups are compared in Chart 1. One finds that the group which worked in the basic science departments has 50 per cent more graduates now in full-time medical school faculty positions; however, there are no significant differences when one compares these groups as to the per cent currently holding academic appointments of any type and the per cent who stated that they had done some research since graduation. It is of particular interest that about 60 per cent of the replies noted that some research had been done since graduation. In this instance the term "research" must be broadly interpreted; nevertheless, it indicates a continuing interest in investigation among the majority of our graduates. It is also noteworthy that about one-fourth of those who had done research indicated it was in some way related to the research done in medical school.

The stated specialties of the graduates were compared with the departments in which the student research had been done. As one might expect, there is a correlation with the clinical departments. Of 613 graduates in the various clinical specialties, 278 had done their student research in a basic science department and 335 in a clinical department. Chart 2 deals only with those whose research was done in a clinical department. It can be seen that students tended to enter specialties corresponding to the departments in which their research was

Student Research in:	FULL-TIME MEDICAL SCHOOL FACULTY	HOLD ACADEMIC APPOINTMENTS	RESEARCH SINCE GRADUATION	RESEARCH RELATED TO STUDENT RESEARCH
BASIC SCIENCE DEPARTMENTS (46%)	15%	44%	61%	28%
CLINICAL DEPARTMENTS (54%)	10%	41%	58%	24%

CHART 1.—A comparison with regard to subsequent medical careers of graduates (1928–42 and 1948–52) who had done their student research in the basic science departments and those who had done research in the clinical departments. (Total group = 758.)

Departments in which student research was done.	SPECIALTIES OF THE GRADUATES: MEDICINE	SURGERY	SURGICAL SPECIALTIES	PEDIATRICS	OB-GYN	PSYCHIATRY
MEDICINE	51	9	15	18	14	12
SURGERY	6	30	27	9	3	5
PEDIATRICS	8	4	8	28	3	4
OB-GYN	0	3	5	9	9	1
PSYCHIATRY	3	1	2	2	0	8

CHART 2.—Distribution by specialties of the graduates (1928–42 and 1948–53) who had done student research in major clinical departments. Figures underlined are about twice the number expected by proportional distribution of the total group.

done. The figures underlined are about twice the number that would be expected by a proportional distribution of the total group. No such correlation was observed for the basic science departments except for Pathology. We cannot say that this is cause and effect. There is no doubt that many students select for their research the specialty in which they have a career interest. Nevertheless, of the 51 graduates specializing in internal medicine who did their research in the Department of Medicine, 30 per cent indicated that the research project had a *great* influence on the selection of their ultimate medical careers.

voted entirely to research. This has been due, at least in part, to the increased availability of student research fellowships. In Chart 3 the graduates of the five postwar classes, 1948–52, have been grouped as follows: Those whose research was limited to the school year, i.e., no summer or additional year was devoted to research; those who spent one or more summers in research; and those who spent an extra year in research. The table shows the percentage of each group with regard to full-time academic positions, current academic appointments of any type, those who have done research since graduation, and those who are currently engaged in

	FULL-TIME MEDICAL SCHOOL FACULTY	HOLD ACADEMIC APPOINTMENTS	RESEARCH SINCE GRADUATION	CURRENTLY ENGAGED IN RESEARCH
	%	%	%	%
RESEARCH LIMITED TO SCHOOL YEAR (124)	12	40	48	26
SUMMER RESEARCH EXPERIENCE (94)	28	51	75	55
EXTRA YEAR IN RESEARCH (20)	55	70	100	80

CHART 3.—A comparison with regard to subsequent medical careers of postwar graduates (1948–52) whose research was limited to the school year, who had summer research experience, and who devoted an extra year to research. (Total group = 238.)

With regard to the year in which the student research was begun, our data are remarkable in two respects. One, a graduate who began his research in the final year of medical school was less likely to engage in any research after graduation. Two, graduates now in full-time academic positions tended to begin their student research earlier in the school years than did those graduates now in private practice. Thirty-six per cent of the full-time medical school faculty group, as compared with 15 per cent of those in practice, began their research in the first 2 years of medical school.

Since the war years, there has been a considerable increase in the number of students who have elected to spend the summer recess doing research or who have supplemented their medical courses with an extra year de-

some research. In each category the percentage is greater for those with summer research experience and greater still for those who have had an additional year.

Undoubtedly, the student who already has an interest in research is more likely to devote extra time to research activities. It is also possible that a more prolonged and intensive exposure to investigative work enhances the student's interest and thereby increases his chances of entering an academic career or of doing some research after leaving medical school.

We recognize the hazards of drawing conclusions from surveys based upon retrospective opinions; however, we believe that the opinions of the 758 graduates regarding the influence of the research program are of interest. On the questionnaire graduates were

requested to "Indicate how much you believe your thesis project influenced you in selection of your ultimate medical career" and were given the choices of none, slightly, moderately, or greatly. At this medical school "thesis project" is considered synonymous with research since the thesis is based upon the student's research. In Table 1 the replies of those now in full-time medical school faculty positions are compared with the total group. Thirty-seven per cent of the total and 63 per cent of the full-time faculty group indicated some influence in this regard.

TABLE 1

OPINIONS CONCERNING INFLUENCE IN SELECTION OF ULTIMATE MEDICAL CAREER

	None	Slight	Moderate	Great
	(per cent)			
Total	62	15	12	10
FTMSF	33	20	20	23

Replies to the question "Indicate how much you believe the preparation of a thesis has helped you subsequently in the evaluation of reports published by others in the medical literature" are shown in Table 2. Eighty-three per cent indicated that they felt it was of some assistance.

TABLE 2

OPINIONS CONCERNING SUBSEQUENT HELP IN EVALUATION OF THE MEDICAL LITERATURE (TOTAL GROUP 758)

None	Slight	Moderate	Great
(per cent)			
14	16	28	39

In another question the graduates were asked "Which of the following would you recommend? (*a*) that a thesis based on research be required of all medical students; (*b*) that research be available to medical students on an elective basis; (*c*) that research not be included as part of the medical curriculum." In addition to the total group, replies from those in private practice and full-time teaching are compared in Chart 4; there is no significant difference in these two groups. It is interesting to note that if one examines the replies of those graduates in general practice there is still no significant difference. Of the total replies, 98 per cent were in favor of research, required or elective, as part of the medical curriculum, and 60 per cent recommended that a thesis based on research be required of all students.

Recommendation:	ACTIVE PRIVATE PRACTICE	FULL-TIME MEDICAL SCHOOL FACULTY	TOTAL GROUP
	%	%	%
(a) RESEARCH BE REQUIRED OF ALL STUDENTS	57	69	60
(b) RESEARCH BE AVAILABLE ON ELECTIVE BASIS	40	31	38
(c) RESEARCH NOT BE INCLUDED IN THE CURRICULUM	2	0	2

CHART 4.—Recommendations of graduates (1928–42 and 1948–52) regarding the place of research in the medical curriculum. Replies from those in private practice and full-time teaching are compared. (Total group = 758.)

Two-thirds of those replying added written comments to the questionnaire. Those who recommended that a thesis based on research be required of all students commented most frequently on the assistance in critically evaluating the medical literature, the advantages of fostering scientific discipline, the value of learning to write for publication, the opportunity for close association with a member of the faculty, the

recruitment of individuals for research careers, and the fact that many students would never have this experience if it were not required.

Those who recommended that research be available on an elective basis commented most frequently on the inadequate return for the time spent; many felt that research should be reserved for the outstanding students who have demonstrated special aptitude and that not much was gained if the student were not interested in research. The thirteen graduates who were opposed to research as part of the curriculum felt that the time could be better spent in clinical work, the art of medicine, and classes dealing with economics, medical writing, and biometrics.

We were particularly interested to note the distribution of graduates of each class in various professional activities. Accordingly, they were grouped in the following categories: general practice, part-time specialty practice, full-time specialty practice, full-time medical school faculty, government services (including military service), full-time hospital positions, industry, residencies and fellowships, and retired. For the purposes of this report, classes were grouped in 5-year periods to show possible trends. Chart 5 shows the percentage distribution for each 5-year group by type of professional activity. The column listed as "other" includes those in industry, residencies and fellowships, or retirement.

In spite of some minor fluctuations one sees no outstanding differences among the 5-year groups except in the percentage in full-time medical school faculty positions. Here the trend is obvious, with an increase from 4 per cent in the classes of 1928–32 to 21 per cent in 1948–52.

Various influences may be cited to explain this increase. The greater number of full-time positions in medical schools throughout the country is certainly an important consideration. In a 1950 analysis of the distribution of medical graduates, 1915–40, Weiskotten (2) noted the trend of an increasing percentage in full-time medical college teaching and research positions. This trend undoubtedly has continued during the past 9 years. Nevertheless, it is unlikely that an increase of the magnitude noted in our data can be explained solely on the basis of more available positions.

	GENERAL PRACTICE	PART-TIME SPECIALTY PRACTICE	FULL-TIME SPECIALTY PRACTICE	FULL-TIME MED SCHOOL FACULTY	GOVT. SERVICES	FULL-TIME HOSPITAL POSITION	OTHER
	%	%	%	%	%	%	%
1928-32	8	9	52	4	15	5	5
1933-37	12	5	55	9	9	5	5
1938-42	11	3	59	11	5	7	3
1943-47 (W)	5	5	60	14	8	3	5
1948-52	10	4	40	21	5	6	12*

CHART 5.—Distribution of graduates, in each 5-year period, by type of professional activity. *W* indicates war classes.

* 7 per cent of 1948–52 graduates are still in residency training.

One might be tempted to attribute this growing trend among our graduates, at least in part, to the research program; however, the percentage of full-time faculty positions among graduates of the war classes (1943–47), when no research was required, shows no alteration of the trend. Therefore, we cannot conclude that the student research program, in spite of its many benefits, is a major factor in explaining the increased percentage of graduates who are engaged in full-time academic positions.

Question may be raised as to whether this

increase reflects a change in the type of applicant or in the admissions policies. Since the graduating classes of 1948 and 1949 were admitted during the period of the wartime accelerated program when some students were assigned to the school by the armed services and yet these classes show no change in the trend, such a premise is unlikely.

Chart 6 shows, again by 5-year groups, the percentage of graduates who currently hold academic appointments of any type and those who indicated that they had done some research since leaving medical school. It is interesting to note that there are no significant differences even in the war classes.

	HOLD ACADEMIC APPOINTMENTS	RESEARCH SINCE GRADUATION
	%	%
1928 – 32	36	58
1933 – 37	44	58
1938 – 42	38	59
1943 – 47 (W)	45	64
1948 – 52	47	62

CHART 6.—Percentage of graduates, in each 5-year period, who hold an academic appointment and who have done research since graduation.

Many factors combine to create the atmosphere of a medical school. This atmosphere is undoubtedly of great influence in shaping the future careers of the graduates. Intimate contact with a faculty dedicated to research and the availability of research opportunities would appear to have stimulated in the graduates of this particular school a desire to do research and, in some cases, to pursue an academic career.

SUMMARY

The study of 758 graduates of the classes of 1928–42 and 1948–52 revealed the following:

1. There is a great percentage of full-time medical school faculty among the graduates who had done student research in basic science departments as compared with those who had carried out their research in clinical departments. There are no significant differences, however, when these two groups are compared as to academic appointments of any type and research done since leaving medical school.

2. Graduates who had done student research in clinical departments tended, more often than by expected distribution, to enter those specialties in which the research was done.

3. Graduates in full-time academic positions began their research earlier in the medical school years more frequently than those now in private practice.

4. Thirty-seven per cent of the total group and 63 per cent of those in full-time faculty positions indicated some influence on the part of their student research in selection of their ultimate medical careers.

5. Eighty-three per cent of the graduates felt that preparation of a thesis based on research helped subsequently in evaluation of the medical literature.

6. Ninety-eight per cent of the graduates were in favor of research, required or elective, as part of the medical curriculum, and 60 per cent recommended that a thesis based on research be required of all students. In this regard there were no significant differ-

ences in the recommendations of those in private practice and full-time academic positions.

In the five postwar classes (1948–52), graduates who had spent one or more summers in research, when compared with their colleagues, showed a higher percentage in academic positions and also a higher percentage engaged in some research activity. These percentages were even greater for those who had an extra year of student research experience.

From 1928–32 to 1948–52, the graduates entering full-time medical school faculty positions have increased from 4 per cent to 21 per cent. There was no alteration of this trend on the part of the war classes (1943–47) when student research was not required.

The percentages of graduates holding academic appointments of any type and of those who have engaged in research since leaving medical school have shown no significant change in the 25 years studied, including war classes. Over 40 per cent of the graduates hold some academic appointment, and about 60 per cent indicated that they had done some research since graduation.

REFERENCES

1. LIPPARD, V. W. The Role of Research in the Medical Curriculum. J. M. Educ., **33**:201–6, 1958.
2. WEISKOTTEN, H. G., and ALTENDERFER, M. E. Trends in Medical Practice: An Analysis of the Distribution and Characteristics of Medical College Graduates, 1915–40. J. M. Educ., **27**:3–41, 1952.

The Teaching of Preventive Medicine Reflected by Results of National Board Examinations

JOHN P. HUBBARD, M.D.*
Department of Public Health & Preventive Medicine
University of Pennsylvania, Philadelphia, Pa.

One of the most outstanding features of medical education today is the widespread and growing interest on the part of teachers to evaluate the effectiveness of their teaching, to ask themselves just how good a job they are doing. As this question is answered, changes in curriculum content almost inevitably follow. This Association of Teachers of Preventive Medicine is very familiar with this course of events. It is, in fact, the history of our Association that it started as a Conference of Teachers of Preventive Medicine which conducted two earnest and laborious meetings to explore teaching methods, objectives, and ideas. Our present organization emerged from this manifest interest in teaching.

The conference method is one way of studying the teaching process. Reports are read and discussed, opinions are exchanged, and conclusions arise. There is, however, a more objective and factual way of evaluating teaching. I refer to an analysis of the examination in preventive medicine and public health of the National Board of Medical Examiners.

The examinations of the National Board are now so widely used in medical schools throughout the United States that they provide a sound basis for impartial, objective, extramural evaluation of the knowledge of preventive medicine acquired by the students in these schools. The product then serves as a measure of the process.

* Professor of Public Health and Preventive Medicine, University of Pennsylvania School of Medicine; Executive Secretary, National Board of Medical Examiners.

For the academic year 1958–59, data are available for the students of 30 medical school classes. Many more students now take National Board examinations, either as a requirement of their medical schools or by individual choice as a step toward qualification for a license. However, for the purposes of this present analysis, I have included only those schools in which the examinations are taken by all or virtually all the students of the class. When only a portion of a medical school class takes these examinations, it is likely that a number of the less confident or weaker students are not included in the group. However, when examinations are taken by all the students in the class, the bias of self-selection is eliminated.

Chart 1 shows the manner in which these medical school classes handled the National Board examination in preventive medicine and public health in April, 1959. The schools, identified by code number only, are arrayed from top to bottom according to the rank order of the mean score for the class on this examination, the highest mean score at the top, and lowest mean score at the bottom. To the right of the center line is the per cent of the student class obtaining honor grades (a score of 88 or higher). Similarly, to the left of the mid-line is the per cent of the class obtaining failing grades (a score less than 75). The wide disparities in student performance from school to school immediately become very apparent. In the top ranking school, 50 per cent of the students obtained an honor grade, and there were no failures. In striking contrast to this record,

the school at the bottom of the list had a class in which there were 1.5 per cent honor grades and 28.5 per cent failures.

It is also interesting to note the variation in the range of performance, reflecting thereby the difference in characteristics found among medical school classes. For example, two classes toward the bottom of the list (numbers 35 and 18) have approximately the same mean score, but the range of performance in these classes is very different. One of these two classes (number 18) has approximately half as many honor students and also half as many failures as the other. Thus it appears that the students in this class are all relatively uniform and equal in their knowledge of preventive medicine and public health, whereas class number 35 shows less uniformity with a wider spread between the top ranking students and low ranking students.

These class scores for the test in preventive medicine and public health may be compared with the record of the same medical school classes for the other four subjects of the National Board's examination in Part II for April, 1959.[1] In general, a medical school class shows a tendency to have examination results that are consistent for all subjects. Thus, the senior class in school No. 26, which had such an excellent record in preventive medicine and public health ranked among the top five classes for the other four subjects of Part II. Similarly, the classes at the bottom of the list tended to have poor scores for other subjects. However, considerable variation shows up in other classes: high in certain subjects, low or average in others.

[1] Part II of the National Board examinations includes medicine, surgery, pediatrics, obstetrics-gynecology, and preventive medicine and public health.

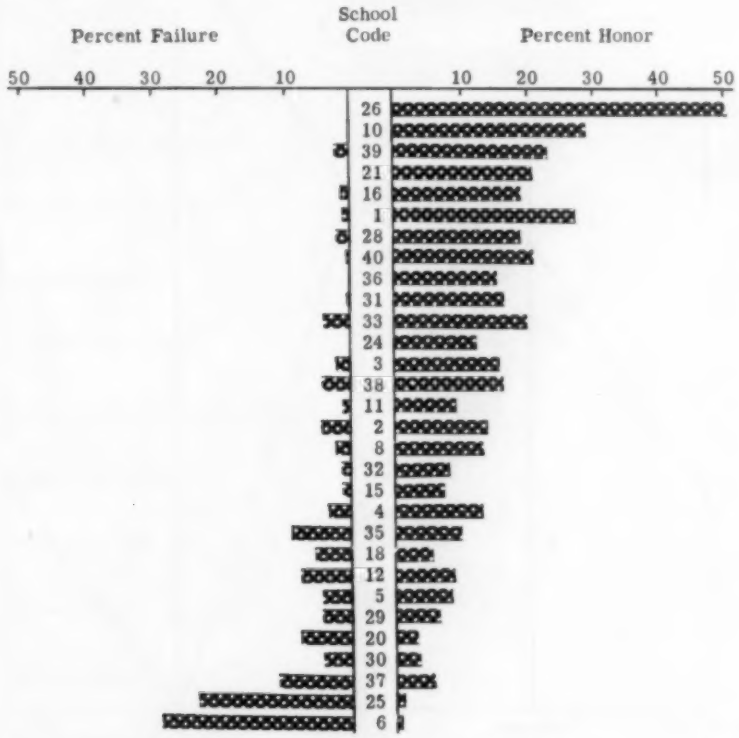


Chart 1.—Performance of students in examinations in Public Health and Preventive Medicine in 30 medical schools (April, 1959).

Chart 2 shows the per cent failure for two senior medical school classes for each subject of the Part II examination, April, 1959. In one school, the students handled the examination in preventive medicine and public health much better than the other subjects; the other school class had considerable difficulty with this test.

Further statistical analysis provides a more detailed measurement of student performance by categories of subject matter within the total test. The Board's Committee on Preventive Medicine, which is responsible for writing the questions and compiling the tests, subdivides the subject matter into fourteen categories. Each question is assigned to the one category to which it is principally related. A mean score for each category then forms the basis upon which the student's knowledge of the subject can be identified in considerable detail, category by category.

Data of such nature are not yet available for the class graduating in 1959, but we have completed this detailed analysis for the classes graduating in 1958. Chart 3 demonstrates the variation in the manner in which the entire group of students handled the questions in each of the fourteen categories of subject matter.

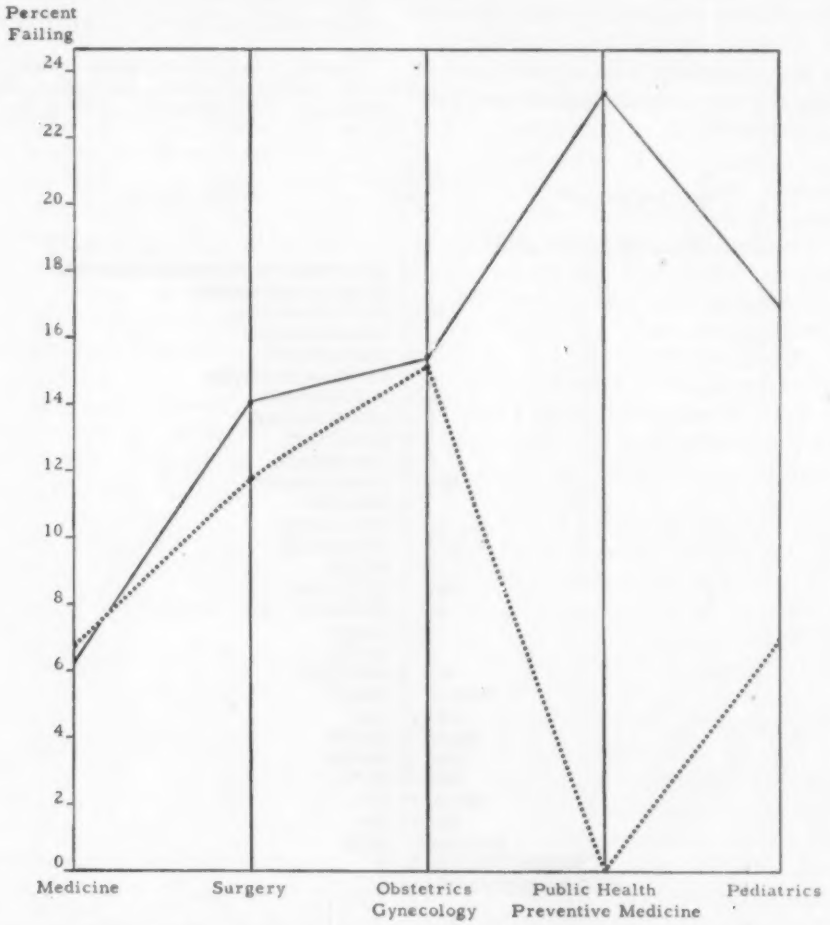


CHART 2.—Per cent failure for two senior medical school classes—Part II, 1959

Biometrics and vital statistics are listed as two separate categories. Possibly this reflects discussion at the second Conference of Teachers of Preventive Medicine at Colorado Springs in 1952. At that time, it was suggested that the subject of medical statistics should in fact be divided into these two component parts. At any rate, as the terms are used here, biometrics includes an understanding of statistical principles, such as validity of data, statistical significance, and errors of measurement. Vital statistics, on the other hand, calls for a knowledge of the bookkeeping of public health, including rates and ratios, incidence and prevalence, and also the reporting of births, deaths, and disease. As thus defined, the total group of students handled the questions on biometrics comparatively well, but did poorly in the category of vital statistics. The students answered correctly 83 per cent of the questions dealing with mental hygiene. Their poorest performance was found with the questions in environmental sanitation (52 per cent).

These data must be viewed in the light of

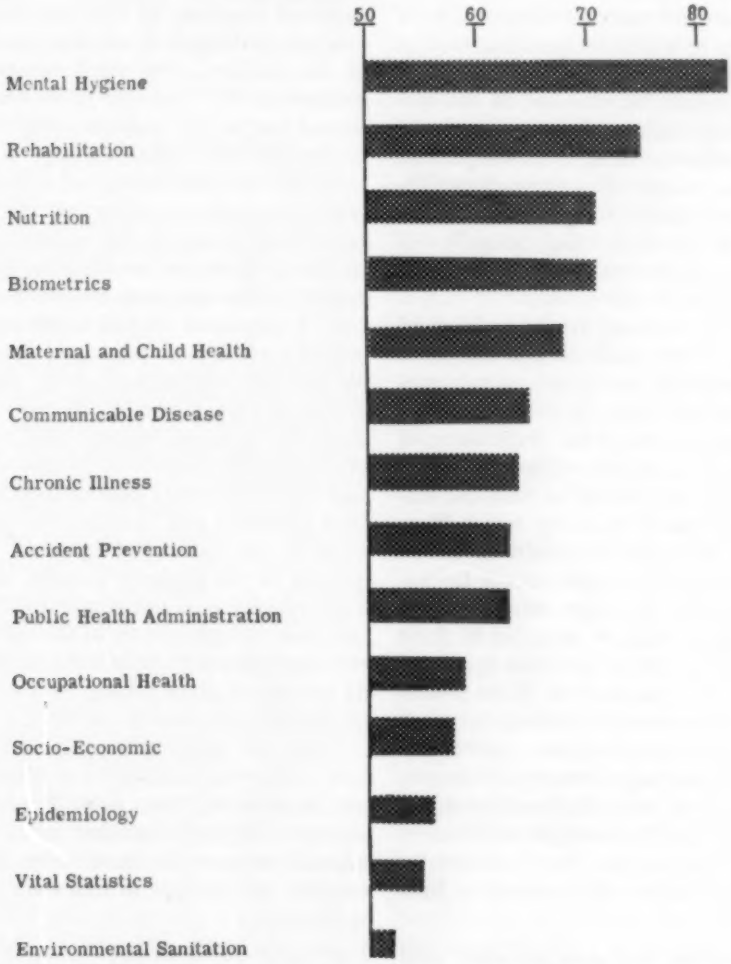


CHART 3.—Per cent correct responses in examination in Public Health and Preventive Medicine by categories of subject matter, (April, 1958; N = 2890).

their limitations. Do they mean that we teach mental hygiene and rehabilitation better than vital statistics and environmental sanitation? Are the differences in per cent right responses for the several categories a real reflection of student knowledge in a particular category, or are the results merely due to more difficult items in one category than in another? This question cannot be answered with statistical accuracy from our data. However, a general assumption can be made. The test committee, as it initially writes the questions and as it later prepares the total test, seeks to maintain consistency in the difficulty of questions irrespective of the categories to which the questions may be assigned. Therefore, although no particular importance should be attached to the specific percentage differences in the students' ability to handle one category in comparison with another, nevertheless these disparities do indicate a relative measurement of the knowledge of the individual categories of subject matter in the total group of students in all the schools in this study.

In order that we may better understand the meaning of the students' knowledge, or lack of knowledge, in these several categories, let us look directly at some of the questions themselves. What were some of the items in the categories of environmental sanitation and vital statistics that the students had so much difficulty with? Were they general principles that really should be familiar to the practicing physician? In considering this point, it is important to bear in mind that no question is included in these examinations unless it has been approved unanimously by a committee of six professors of preventive medicine whose duty it is to see to it that each and every question is clearly stated and representative of important aspects of the field of preventive medicine at the level of the medical student.

The following is a question taken directly from the examination administered in June 1959:

Thoroughly cooked food does not cause food poisoning BECAUSE the staphylococcus toxin is heat-labile.

This type of question calls not only for factual knowledge but also for the students' ability to reason and to apply his knowledge to the problem at hand. This is, in fact, one of the many varieties of questions used in these examinations which supports the claim that objective, multiple-choice examinations are far more than a test of a students' capacity to recall minutia of medical knowledge. When properly constructed, these technics test not only the students' factual knowledge, but also the subtler qualities of discrimination, judgment, and reasoning. The instructions which precede a series of questions of this type require the student to determine whether the first half of the question, considered separately and independently, is true or false, whether the second half of the question, also considered separately and independently, is true or false, and whether the second statement is a correct explanation of the first assertion. He must then mark on his answer sheet his choice of these five possibilities. In this instance, it does not seem too much to expect that a physician should know that thoroughly cooked food may cause food poisoning and that the staphylococcus toxin is resistent to heat. However, an analysis of the students' responses showed that about half of the students seemed to be ignorant of the fact that thoroughly cooked food can cause food poisoning and that the staphylococcus toxin is not destroyed by heat. Another quarter of the students thought that thorough cooking does not eliminate the hazard but were still apparently of the opinion that the staphylococcus toxin is heat-labile. Only 24 per cent of those taking this examination answered this question correctly.

Since this meeting is concerned particularly with vital statistics and biometry, let me draw upon these fields for additional examples. Here is another item which is taken from this same examination and which requires the student to select the one best response:

Death rates during the last 25 years in the United States have fallen faster among

(A) young people than among older persons

(B) males than among females
(C) white males than among white females
(D) nonwhite males than among nonwhite females
(E) white males than among nonwhite males

This is a rather straightforward question involving the fact that death rates during the last 25 years in the United States have fallen faster among young people than among older persons. Nearly half (43 per cent) missed this point.

Or again, consider the following item:

A measure of the prevalence of a disease in a community is obtained by counting the number of
(A) cases present in the community on a particular day
(B) new cases which have developed in the past year
(C) new cases which have developed in the past year plus the number of deaths in that year
(D) cases present in the community on a particular day plus the number of deaths in that year
(E) cases in the hospitals of the community on a particular day

Less than half (47 per cent) appeared to know what we mean by prevalence. A considerable proportion of the students selected the B answer, revealing their idea of prevalence as the number of new cases which have developed during the period of a year.

Lest this account appear to be too disheartening and in order to lend encouragement to those responsible for teaching biometry, let us look at another question:

(A) The standard error of the mean of fifty observations
(B) The standard error of the mean of six observations from the same population and utilizing the same procedure

Here is a type of question consisting of paired statements describing two entities which are to be compared in a quantitative sense. The student is required to indicate whether the first statement is greater than the second, whether the second is greater than the first, or whether the two are equal or very nearly equal. Here we may note with some satisfaction that 82 per cent of the students appeared to be aware that the standard error of the mean of six observations would be expected to be greater than the standard error of the mean of 50 observations from the same population when utilizing the same procedure.

Up to this point we have been discussing the performance of the entire group of students in the several categories of the subject matter in the examination in preventive medicine and public health. When the category scores are computed and tabulated separately for an individual medical school class, comparisons may then be made with other schools and with the range of performance in the total group. In order to illustrate the kind of comparisons which then become possible, I have selected one school and charted graphically the performance of its senior class in the various categories of subject matter against the background of the average performance of the entire student population (Chart 4). These categories, it may be noted, are listed in the same order as in Chart 1 when it was noted that, for the entire group, mental hygiene and rehabilitation were at the top of the list and vital statistics and environmental sanitation were at the bottom of the list in terms of the percentage of correct responses for the items in the categories. The bars extending to the right of the midline represent performance better than the average, while the bars to the left of the midline denote less than average competence in handling the subject matter of the categories. The faculty of the department of preventive medicine in this school might find considerable satisfaction in knowing that their students performed better than the average in the category of chronic illness and degenerative diseases. On the other hand, relative weaknesses appear in the categories of epidemiology and communicable disease control.

A word of caution is indicated in interpreting a profile such as this which suggests the strengths and weaknesses in the students' knowledge of the separate categories. The performance in one category does not

necessarily reflect the teaching content or the quality of the medical school department responsible for that particular aspect. For example, with respect to superior performance of this student class in responding to the questions of chronic illness and degenerative diseases, it is possible that other departments in this school are particularly strong in this subject and that the performance on this test reflects information acquired in other courses such as pathology, medicine, and surgery.

However, if one bears in mind the limitations inherent in this type of study, it does become possible to suggest certain weaknesses and strengths in the teaching of separate aspects of a given subject. Thus, the Department of Preventive Medicine and Public Health in the school selected for Chart 4 has, as a matter of fact, taken a hard look at its teaching program with special reference to epidemiology. Although its senior class performed reasonably well for the test as a whole (School No. 40 in Chart 1), the Department found reason for certain curriculum changes.

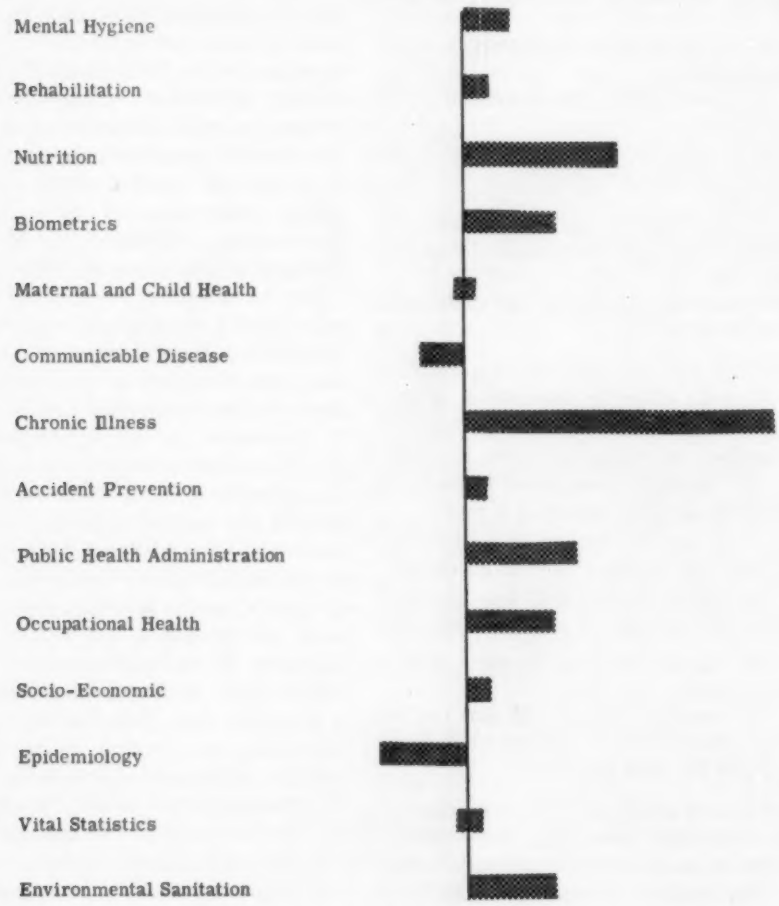


CHART 4.—Mean category score of one senior class in comparison with mean category score of total group (N = 2890) in examination in Public Health and Preventive Medicine by categories of subject matter (April, 1958).

Each year, the National Board reports to medical schools the performance of their students for each of the individual subjects of Part I (basic sciences) and Part II (clinical subjects). The more detailed type of analysis by categories of the separate tests involves such time-consuming statistical analysis that it has not seemed justifiable to undertake this type of report on an annual basis. However, with the comparative analysis of the individual subjects available each year and a more detailed analysis at less frequent intervals, the examinations of the National Board provide a realistic and factual basis upon which a medical school may judge its own teaching efforts.

Objectives of Biostatistics Instruction in the Medical School*

CARL E. HOPKINS, PH.D., M.P.H.†
University of Oregon Medical School, Portland, Oregon

Although we may profess and teach rigorous statistical methods for testing beliefs, drawing inferences and making decisions based on properly gathered experimental evidence, we do not usually conduct experiments, or even make systematic survey studies when we are faced with making decisions about objectives and means of teaching statistics. We simply follow our impressions, or, as a popular drug advertisement proclaims, our "clinical judgment dictates the choice."

Likewise the material of this paper is not, strictly speaking, drawn from experimental evidence. At best it can be called impressions, opinions, and preferences drawn from several years of experience with the subject, and is not offered as scientific findings, but as hypotheses for experimental testing. In considering objectives in biostatistics instruction we should first have a perspective with respect to the over-all objectives of medical education. What kind of product are we planning to achieve? The answer to this question requires some prescience, since we are now preparing personnel for the practice of medicine not today but 10–40 years hence. Thus we must have a concept of what the demands of practice will be in the future. The principal questions appear to be: (*a*) Is increasing division of labor, with increasing specialism, the pattern of the future? and (*b*) Are our students to be scientists or consumers of science, or a mixture? If the latter, can we train both kinds simultaneously? Next, it is necessary to recognize that, whatever the technological trends of the future, the product of medical education must be:

a) *An educated citizen.*—So far as statistics is concerned, this appears to require that he be capable of a stochastic view of experience—an habitual awareness of variability, probabilism, and the fallibility of inductive inference. As Snedecor has put it, this is simply a matter of "bringing the student into harmony with his physical, biological and economic environment of variation and uncertainty. . . . The nature of decisions based on probability, experience in sampling together with the concomitant risk in drawing conclusions, the fundamentals of our great cooperation in insurance, the social implications of betting—these are a few of the numerous facts of life that should form the structure of our courses in statistics." For everyday life in a society as deeply involved in science as ours it seems a truism that the intelligent citizen should have developed a habit of understanding, if not fully accepting, scientific ways of interpreting his experience, drawing conclusions and making decisions.

b) *A trained professional.*—For practice of the healing arts and also for systematic inquiry or research. This implies acquisition of certain useful knowledges and skills from the discipline of statistics:

1. To understand the experiment designs and logical structure of the methods of inference by which scientific facts, hypotheses, and theories are obtained.

* Based on a talk given at annual meeting of Association of Teachers of Preventive Medicine, Atlantic City, N.J., October 18, 1959.

† Associate Professor of Public Health and Preventive Medicine.

2. To acquire a minimum working vocabulary, with clear concepts attached to the words. For example, it is not sufficient for him to use such terms as correlation, significance, validity, in the usual layman's vague sense. He needs an explicit concept of their technical meanings and implications. This he needs even for ***understanding*** what he hears and reads, and still more for critical judgment and decision-making.

3. To acquire appreciation of the available statistical principles and tools as a foundation for original thinking or research.

What do these objectives imply about the means of attaining them, the content of the learning experience in biostatistics? They seem to imply that medical students need to have become acquainted with at least the following ideas:

1. How to solve a problem. The logical foundations of scientific method are envisaged here—observation, conjecture, analogy, hypothesis testing, proof, etc. (5).

2. An introduction to fundamental theory and the tools of statistics. Here the concepts and the theorems are more important than the formulas. To prevent the prevalent misconception that statistics is an inexact mathematics of rule-of-thumb formulas, some of the fundamental theorems should be proved as well as confirmed by laboratory experiments and exercises. For example, the Central Limit Theorem in its entirety cannot very well be proved by or for the beginner. However, the most used part of it, the standard error of the mean, can be rather easily derived from the definition of expectation (mean) and the theorem for the variance of a sum of independent variates. The Central Limit Theorem itself can be fairly easily proved to students with calculus background for the special case of a distribution with a finite moment function (3).

Introduction to the fundamental theory and tools should probably include:

a) Methods of condensing and describing variable aggregates. This would involve introduction to the frequency concept of probability and to a few commonly encountered probability distributions, such as the Binomial, Poisson, Normal and Log-Normal. This leads directly to measures of location and scale of such distributions, the mean and variance.

b) The concept of sampling process and its consequences for the inferences we make from samples. Here the basic armamentarium would appear to include acquaintance with the Central Limit Theorem and the Law of Large Numbers (popularly intuited as "the law of averages"?), estimation of population parameters by statistics of samples, confidence limits and their use for tests of significance in a few simple situations such as the precision of a mean or proportion, a mean difference, differences between means (analysis of variance including the special case of only two means), estimates of relationships such as contingency and association, correlation, and regression.

While classical theory is given its due in this parade, some short-cut methods of application should be put into the hands of students. Such useful shortcuts as the range estimate of the standard deviation, the sign test, use of probability paper, and some other graphic approximations (Askovitz) can be used in the laboratory to illustrate the theoretic concepts without overburdening the student with tedious computations (2, 6).

These techniques are to be examined always in the light of the logical structure of the experiment.

Top students should perhaps be tantalized by inclusion of brief mention of some advanced topics such as game and decision theory, stochastic processes, etc. (4).

3. Practical applications in fields of the medical student's primary interests can be the basis for his experimental testing and first-hand experience of the practical implications of the theory.

a) Vital statistics and epidemiologic method. Rates and ratios and their comparison need to be part of the student's every-day equipment. The logic of epidemiologic method, viewed in the context of experiment design, should lay some theoretic groundwork for the study of epidemiology.

b) Survey studies. Retrospective studies, their uses and misuses, prospective studies, their virtues and limitations, and sampling implications of survey studies should be studied with a view to bringing out such issues as definition of the problem and study objec-

tives, estimation vs. hypothesis testing, and decision-making.

c) Controlled experiments in laboratory and clinic. Issues and considerations in the planning and execution of laboratory experiments, clinical trials, etc., can be studied in the light of the statistical theory.

d) Everyday uses of statistical reasoning in medicine.

i. Diagnosis. The statistical nature and hence the uncertainty of medical diagnosis can be used to illustrate estimation (normal values), discrimination, two kinds of error, decision making under uncertainty. Statistics has a fundamental contribution to make here in providing for the anxious medical student and future physician a philosophy and technique for handling his ever-present problem of dealing with uncertainty.

ii. Prognosis and risks of procedures. Binomial and Poisson distributions become realities when procedure risks, e.g., surgery, are studied, and the log-normal distribution can be studied in the context of prognosis and survival time analysis.

iii. Biological assay can be used to elucidate the difference between continuous and discrete measurements, the use of transformations, and the general theory of regression.

iv. Genetics, including population genetics, affords opportunities for study of the binomial distribution and of stochastic processes.

v. Presentation of results of research belongs in the statistics curriculum because nowhere else do students do any systematic thinking about how to read an article, how to organize and present data, how to read and use graphs and other illustrative material, how to compose a report.

Since means may often shape ends, a final word needs to be said about the sponsorship of biostatistics instruction in the medical school. While credit is due the pioneers of public health and preventive medicine for their early recognition of the contribution of this discipline to medical education, there is no longer any cogent reason why biostatistics should be identified with public health and preventive medicine. For biostatistics is statistics, and statistics is mathematics, and, while these disciplines are certainly of interest and import to preventive medicine, they are no more so than to any other of the many specialties of medicine and biological science. Whatever the historical warrant for identifying biostatistics with preventive medicine (and public health), retention of this tradition inevitably obscures the present fact that statistics is a general-purpose methodological tool that is basic to all branches of biological science, and in addition lays a heavy and unequal burden of service responsibility on departments of preventive medicine. The future should see biostatistics assume its proper role as a basic discipline in the medical school curriculum.

REFERENCES

1. ASKOVITZ, S. I. The Method of Moving Averages in the Analysis of Data. J. Albert Einstein Medical Center, New York, 1957. Other articles by same author in *Science* and elsewhere.
2. DIXON, W. J., and MASSEY, F. J. Introduction to Statistical Analysis. 2d ed. New York: McGraw-Hill Company, 1956.
3. FRASER, D. A. Statistics: An Introduction. New York: John Wiley & Sons, 1958.
4. KEMENY, J. G.; SNELL, J. L.; and THOMPSON, G. L. Introduction to Finite Mathematics. Englewood Cliffs: Prentice-Hall, Inc., 1956.
5. POLYA, G. Patterns of Plausible Inference. 2 vols. Princeton: Princeton University Press, 1954.
6. TATE, M. W., and CLELLAND, R. C. Nonparametric and Shortcut Statistics. Danville: The Interstate Press, 1957.

Social and Preventive Medicine as an Undergraduate Academic Discipline in the University College of the West Indies*

R. JOHN GOURLAY
University College of the West Indies, Dept. of Social & Preventive Medicine, Jamaica, B.W.I.

It seems unnecessary to attempt to define social and preventive medicine, just as it is unnecessary to define medicine vis-à-vis surgery. A definition which is satisfactory in one era may be too limiting in the next, although Ryle's (1) definition of social medicine even now seems adequate. The different aspects of social and preventive medicine deserve different emphasis in the various parts of the world. In the West Indies an attempt has been made and is being made to provide the students with what is likely to be of most value to them in their careers.

At the undergraduate level the teaching program is not designed to produce ready-made Medical Officers of Health—this is surely the province of postgraduate teaching, in the same way as the training of surgeons is a postgraduate discipline. This is an important point of view that is constantly kept in mind in designing or modifying the course.

After graduation and the obligatory hospital residentships, a doctor intending to practise in the West Indies has the choice of going into private practice, government dispensary practice, or a combination of both; he may in some of the smaller islands become a district Medical Officer for which he does not necessarily need a degree or diploma in Public Health; or he may elect to become a part-time Medical Officer under the Poor Law, combining this with private practice. If he intends to devote himself to hospital practice, whether as surgeon or physician, or in some cases as both, or if he intends to enter the Public Health field, postgraduate training culminating in the acquisition of higher degrees or diplomas is certainly advisable.

It is the duty, therefore, of teachers to prepare students for several varieties of medical practice and at the same time to give those students who intend to specialize in hospitals, laboratories, or elsewhere a wider concept of medicine than can usually be obtained in their training at the bedside, in the operating theatre, or in the laboratory.

The pattern of services available to the peoples of the West Indies in the fields of curative medicine and Public Health varies somewhat in the different territories and has been conditioned by financial considerations and the availability of medical and paramedical personnel. There are, therefore, still gaps in the service. The students must be made aware of these gaps and of the way in which other countries have sought to fill these gaps.

By study and discussion of the medical care available in other parts of the world the student can be encouraged to select what is likely to be applicable to his own territory and to adapt what seems good to his own local circumstances when he graduates. This type of teaching cannot fail to

* The Social and Preventive Medicine Unit of the University College of the West Indies was established in April, 1957, with the help of the Rockefeller Foundation.

have an increasing impact on the development of medical services throughout the West Indies and for that very reason must be approached with considerable care and intellectual honesty by the teaching staff.

It is not proposed to deal with the specific research projects which the staff of the Social and Preventive Medicine Unit of the University College of the West Indies undertakes, nor is it proposed to discuss in this paper the help which the Unit should be in a position to offer to the governments of the different territories.

The staff consists of a Senior Lecturer, a part-time lecturer, an Assistant Lecturer, a Senior Public Health Inspector, a Public Health Nurse, a part-time hospital Nurse, and a Public Health Inspector who acts as Secretary and "Business Manager." The Unit has a small motor bus for the purpose of transporting students on visits.

The Unit has contact with students in their 3 clinical years, that is, in the fourth, fifth, and sixth years of their medical course. The number of students in each year averages between 20 and 30.

During the first clinical year, three or four students at a time are introduced to a rural community of some 6,000 people situated seventeen miles from the University. On Monday mornings two homes in which there is some problem of illness, and which have previously been selected by the Senior Public Health Inspector, are visited. At each home the relevant history is presented, and a brief physical examination, sufficient in most cases to establish a diagnosis, is made; interesting physical findings are demonstrated to the students, but no attempt is made to teach aspects of clinical medicine which are adequately covered in the ward teaching. In the discussion which follows emphasis is laid on the possible etiological factors which may be present in the physical, social, and emotional environment of the patient. Special attention is paid to nutritional factors—diets well below the standards recommended by the British Medical Association (2) and the Food and Nutrition Board National Research Council (3) being commonplace. The impact of illness in a home from the economic point of view is stressed, and the management of the patient, including his rehabilitation, is considered. The student is introduced to the idea of comprehensive medical care and is told about the various statutory and voluntary services that may be invoked in the specific instances under consideration.

Two actual case reports will illustrate the type of problem the students meet on these visits. A visit was paid to a 40-year-old man suffering from diabetes. He had been in the University College Hospital and had been discharged on insulin and with a diet sheet. He was unable for one reason or another to administer the insulin himself and so had to walk 2 miles to the government dispensary each day to have his injections. His home consisted of a mud and wattle unfurnished two-room dwelling with pit latrine sanitation. He obtained his water either from a gully half a mile away down a steep hill or used rain water collected in a metal drum. He cultivated a small plot of land about an acre in extent. He lived with his wife, daughter, and grandson. His wife earned a few shillings a week selling vegetables in the market. The crops he grew consisted largely of carbohydrate—yams, corn, and breadfruit. His diet demanded *inter alia* protein and butter, which he was unable to afford.

It was pointed out to the students that if a man has to walk 2 miles each day for an injection of insulin, he is likely to default; also, the time spent on his journey and at the clinic was time which might have been used for cultivating his land. The alternatives of enlisting the aid of an intelligent neighbor or of using the services of a home nurse were discussed. There is no Home Nursing Service in the area at present, so this example served to impress on the students the need for such a service.

The diet sheet which he had been given was then discussed item by item, and the students were encouraged to make practical suggestions for overcoming the financial difficulties involved. Could he grow cow peas or gungo peas to increase his protein intake,

or could he keep chickens or rabbits for the same reason? It was eventually agreed that if the man could make a rabbit hutch the staff of the Unit would provide rabbits for him. In Jamaica it is fortunate that there are good vegetable fat substitutes for butter, which is expensive. Coconut oil is extensively used in cooking, and there are at least two vegetables which are very rich in fat—ackees, which grow in profusion and contain 17 gm. per cent fat, and avocado pears, which contain up to 20 gm. per cent fat. It was possible, therefore, to modify the diet according to the financial means of the patient, and the modified diet was submitted to the hospital for comment before being used.

Bush teas are widely used in Jamaica for all kinds of ailments, and there is hardly a baby in the island who has not been given mint tea as a carminative. There are many kinds of bush teas, the usual method of preparation being to pour boiling water on to three or four leaves of whatever bush is being used, allowing the infusion to cool and drawing off the liquor, which is frequently sweetened with sugar. At least two have been shown by Bras *et al.* (4) to be capable of causing veno-occlusive disease of the liver.

The second illustration concerns bush teas and a 6-month-old baby who had never been breast-fed because the mother had developed a breast abscess. It had been fed satisfactorily on a proprietary brand of milk powder up to a fortnight before the students' visit. The mother was able to afford this milk powder because the father had been giving her some money each week. The father then left the district, and for a fortnight the baby had been fed exclusively on mint tea sweetened with sugar. At the time of the visit the baby was considerably underweight.

The many facets of the problem were brought out in discussion with the students—among them, the social problem of the insecurity of unmarried mothers. The students were told how the mother could obtain dried milk at the clinic for her baby, and they were present when one of the staff of the Unit gave detailed instructions to the mother on the preparation of the milk for feeding.

The students thought it advisable for public health nurses to pay home visits to all babies in their areas who did not attend at the government child welfare clinics so that proper instructions in infant feeding could be given.

On the Friday visits, which again are undertaken with three or four students, each student is allocated a family which he visits on four or five occasions during the rest of the academic year. The object of these family studies is to give students the opportunity of becoming acquainted with the way of life of these people and with their problems, whether they be emotional, financial, or have a physical basis. In order to establish rapport more easily the student is given a proforma on which he enters the medical and social history of each member of the family, and, having done that, he proceeds to examine them physically. Through history-taking the students obtain an appreciation of the *modus vivendi* of their families and in practically every case become friends of the family as well as their "student doctors." Under the expert eye of the senior public health inspector of the Unit they investigate the sanitary circumstances of each home, paying attention especially to water supply, the condition of the pit latrine, the control of insect vectors of disease, and home food production in the plot of land which most families cultivate. Problems of infant care and feeding are discussed with the public health nurse of the Unit, and the management of any defects or diseases found is given careful consideration. Illegitimacy is a great problem in Jamaica—almost 70 per cent of the babies are born of unmarried parents. It has been possible in a few instances to persuade the parents of children in the area to marry.

After this introduction to the concept of social and community medicine, the students pass on into their fifth year and are given a course of systematic lectures and demonstration visits which last over three

academic terms and comprise 60 hours of instruction. The subjects covered, either by the staff of the Unit or by visiting lecturers, who are experts in a particular aspect of medico-social care, include environmental hygiene, personal health services, the voluntary social and welfare agencies, the provisions of the Poor Law, vital statistics, statistical methods, mental health, rehabilitation, industrial medicine, epidemiology, the control of insect vectors of disease, occupational hygiene, and so on. Visits by the whole class are paid to a sewage disposal plant, a water purification plant, to milk pasteurization and canning factories, to the Bureau of Health Education, to the abattoir, and to the hospital kitchens to see methods of food storage and preparation.

Owing to the limited time available some of these subjects are only dealt with in a general way, but an attempt is always made to stimulate the student's interest and to show him where more detailed information on these subjects can be found. As part of the systematic course the students are required to keep a daybook of the visits made. They are also each given a specific project; for example, they may be asked to obtain certain information about their own parish if they come from Jamaica, or their own island or territory if they come from other parts of the Caribbean. Information is required about population, climatology and geology, vital statistics, endemic diseases and their control, and the organization of the medical services. This information is intended to stand them in good stead in their future careers.

The fifth-year students are also introduced to health center practice.

The health center consists of a large waiting room with a reception desk, two consulting cubicles and two examination cubicles with a couch in each, a space for dressings and immunization procedures, wash basins, a refrigerator and dispensary for simple drugs and antibiotics. An additional room is available for blood taking for special investigations and routine V.D.R.L. and Kahn tests; this room is also used by students for special patient interviews—for example, for taking a detailed dietary history.

The health center serves an adjacent population of some 1,000 persons living in a government settlement. Basic environmental data about each household were obtained by the staff of the Unit before the health center became operative.

The health center is open on two mornings per week for self-referred patients, and two fifth-year students are invited on each occasion. Two medical members of the staff of the Unit attend and are assisted by two nurses, a senior public health inspector and a clerk. The students sit in with the doctor and are taught the art of consultation. Time is taken to discuss with them the logical approach to the treatment of such everyday conditions as influenza, the common cold, backache (which is very common), rheumatic conditions, hypertension, and so on. They are shown how to prescribe drugs in the correct quantities, and they are expected to learn the cost of the various medicaments used, especially antibiotics. Experience has shown that students are not well versed in the management of many of the day-to-day problems of this type of medical practice; this part of their training is therefore of great value to them.

After 1½ hours of this work the students listen to a short talk on some health topic which is given to the patients in the waiting room either by a member of the staff or by a sixth-year student. The subjects covered include nutrition, with special emphasis on protein consumption, personal cleanliness, environmental hygiene, simple health rules, the spread of infection, the control of flies and mosquitoes, and so on.

These talks are much appreciated by the patients and have had quite a considerable impact; this was confirmed by a simple evaluation procedure. After this talk the students usually visit one or two homes in the settlement with a member of staff to follow-up patients already seen in the health center. These visits have been a great help in the management of problems such as recurrent diarrhea, grossly infected skin lesions,

peptic ulcers, and so on. The students spend a total of some 4 hours each clinic morning under the guidance of the staff.

Two final year students visit the health center twice a week and are invited to see patients under the supervision of a member of staff. Their technique of examination of patients is, of course, good at this stage in their careers, but their approach to the logical treatment of everyday illnesses is sometimes weak; more time is therefore taken to discuss the treatment and management of patients than in instructing students in examination procedures, which is done in any case in the wards and out-patient departments of the hospital. All students are also taught to give explicit instructions to patients whether it be in relation to taking their medicine or to altering their diet or to rationalizing some emotional difficulty. Emphasis is placed on the effect of environmental factors in the etiology of disease and the effect of disease on the economics of home life.

A middle-aged man was seen at the health center some time ago complaining of general weakness and inability to do his work as a laborer. As a result of having no money coming into the home he was able to afford the barest minimum of food and therefore was unable to regain his health. This problem of the vicious circle was discussed with the students and was used as a text for suggesting what services should be made available in a community to meet such needs. There is, of course, Poor Relief in Jamaica, but often people are unwilling to make use of it. It is through problems like this that students are introduced to the concept of comprehensive medical care and the role of statutory and voluntary agencies in the total care of their patients.

A systematic course of twenty lectures dealing with communicable diseases and their control is given to the sixth-year students. This is not altogether a satisfactory way of teaching, as it is seldom possible to demonstrate patients suffering from these diseases. There is at present no infectious disease unit in the University College Hospital.

The author would like to see a small infectious disease unit set up in association with the University College Hospital for the treatment of patients suffering from certain infectious diseases. This would have the dual advantage of preventing the admission of infectious patients to the general wards and of providing material for student teaching.

From time to time patients discharged from the University College Hospital are visited in their own homes in company with one or two students who have clerked the case on the wards. Patients who show problems of home management or rehabilitation are selected, and a preliminary visit is paid by the public health nurse. These visits are not always easy to arrange for at least two reasons: either the student who has clerked the case has moved on to another ward, or the discharged patient has returned to work and is not available for a home visit. Several visits, however, have been undertaken to patients suffering from such conditions as recurrent peptic ulcer, hemiplegia, coronary insufficiency, and rheumatoid arthritis.

In this paper little attempt has been made to discuss didactically this discipline. The object has been to show what is actually being done in the student teaching program and thus to reveal the aims and philosophies which lie behind.

REFERENCES

1. Ryle, J. A. Social Pathology. Social Medicine, p. 56. New York: The Commonwealth Fund, 1949.
2. British Medical Association Committee on Nutrition, London, 1950.
3. Food and Nutrition Board, National Research Council of the U.S.A., 1948 Revision.
4. Bras, G.; Berry, D. M., and Gyorgy, M. D. Plants as Aetiological Factors in Veno-occlusive-Disease of the Liver, pp. 960–62. The Lancet, London, May 11, 1957.

Electronic Instrumentation in a Medical Physiology Laboratory–an Evaluation after 2 Years' Experience*

CLARENCE N. PEISS, PH.D.,† ROBERT D. McCOOK, M.S.,‡ ALLEN A. ROVICK, PH.D.,§ AND WALTER C. RANDALL,# PH.D.

Department of Physiology, Stritch School of Medicine of Loyola University, Chicago, Ill.

INTRODUCTION

The application of modern electronic recording techniques to the teaching of physiology in a medical school curriculum has been fully described by Hoff and his associates (1, 2). The advantages of this experiment in the teaching of physiology to medical school students have been amply discussed. After 2 years of experience with similar recording equipment, we heartily agree with their conclusions and enthusiasm.

It is the purpose of this communication to describe our experience in setting up a physiology laboratory using commercially available recording equipment and transducers, together with modest shop facilities within the department. Through the use of the interwiring system described below, it was found possible to achieve many of the advantages of the Baylor "broadcast demonstration" at very low cost.

The organization of such a laboratory at the Stritch School of Medicine had to meet certain general requirements:

1. The system must be capable of recording all physiological phenomena routinely studied in a medical physiology course.

2. It should be able to service more than one area of instruction in the Basic Medical Sciences. The recording techniques adopted were originally designed to service both Physiology and Pharmacology. They are now used to teach certain aspects of the Neuroanatomy-Neurophysiology course for medical students.

3. The recording system should be capable of standardization of and reduction in the number of components used.

4. Cost of operation and maintenance should be low, in terms both of money and of staff time involved. Although the services of a full-time electronics technician would be highly desirable, and even necessary in a large operation, it should be possible to operate the laboratory without such full-time services.

5. The equipment should be adaptable for research use.

CURRENT OPERATION OF THE LABORATORY IN PHYSIOLOGY

The physiology laboratory is currently equipped with twelve Grass Polygraphs, providing four channels for electronic recording plus an event-marker. Six-channel consoles are used, providing additional mounting space for other equipment. Model 5P1 Low-Level D.C. preamplifiers are used for each channel. Coupled with the Grass Driver Amplifier, this requires shelf replace-

* The authors are indebted to Dean John Sheehan for his continuing enthusiasm and encouragement. His support in the acquisition of the basic recording equipment has been invaluable.

† Professor of Physiology.

‡ Cabell Fellow in Physiology.

§ Associate, Department of Physiology.

Professor and Chairman, Department of Physiology.

ment for a minimum number of components. This combination of amplifiers has proved highly satisfactory in recording all physiological phenomena in our laboratory course, including muscle contraction, respiration, temperature, blood pressure, ECG, EEG, etc. Four medical students are assigned to each unit. The other half of the class on any given day work in another laboratory on an experiment not involving the Grass Polygraph.

TABLE 1

REPRESENTATIVE LIST OF TRANSDUCERS AND PHYSIOLOGICAL EVENTS RECORDED IN THE STUDENT LABORATORY

Transducers indicated by asterisk are constructed in the department.

Transducer	Type of Recording
Statham P23AC	Blood pressure, intracranial pressure
" "	Pericardial pressure (via pneumatic coupling)
" "	Intrapleural pressure (via pneumatic coupling)
" "	Intratracheal pressure (via pneumatic coupling)
" "	Turtle heart contraction (via tambour coupling)
" "	Arterial and venous pulses, human (via pneumatic coupling)
Grass FT-10	Muscle contraction
" "	Respiration (via connection to rib cage)
*Strain gauge arch	Myocardial contractile force
*Electrodes	ECG, EMG, EEG
*Thermocouple	Temperature
*Heart Microphone	Heart sounds
*Drop-counting electrodes	Urine flow
*Strain gauge ergometer	Muscle energetics
*Integrator	Blood flow, heart rate

All the experiments in our laboratory course are performed with three commercially available transducers. This does not include relatively simple transducers that are constructed in the department, such as thermocouples, drop-recording electrodes, heart microphone, etc. Each Polygraph unit is provided with two Statham P23AC pressure transducers and one Grass FT-10 force transducer. In order to achieve the flexibility necessary in the recording of a large variety of physiological phenomena, the transducers have been put to novel uses for which they were certainly not originally designed. For example, the pressure transducers are used in many experiments for recording small pressure changes in pneumatic systems. Table 1 illustrates many of the uses of the transducers in the laboratory course.

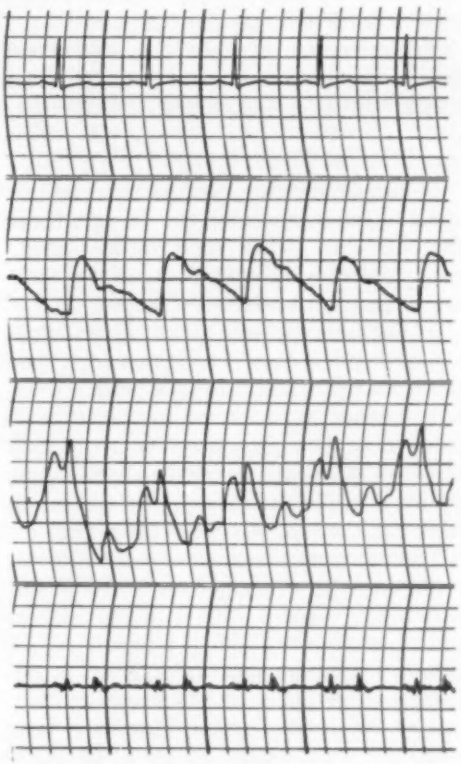


CHART 1.—Simultaneous recording of events in the cardiac cycle in a human subject. From top to bottom: ECG, Lead 2; carotid artery pulse; jugular vein pulse; and phonocardiogram. Paper speed—25 mm/sec.

Chart 1 shows a student record obtained during an experiment on the cardiac cycle in the human. The top record is the ECG, Lead 2. The next two records are carotid and jugular pulses recorded from small funnels placed over these vessels in the neck, and led to a pressure transducer through a pneumatic system. The bottom record is a pho-

nocardiogram in which the detector is a small transistor radio speaker. From recordings of this kind, the following areas of physiology are subsequently developed in small discussion groups following the experiment: (*a*) correlation of mechanical and electrical events in the human heart; (*b*) arterial pulse transmission; and (*c*) significance of the venous pulse and valvular function.

Departments interested in further details may obtain a copy of our laboratory manual upon written request.

INTERCONNECTION OF POLYGRAPHS

A simple low-cost method has been devised to interconnect all the Polygraphs in the laboratory. This procedure has significantly broadened the flexibility of the teaching program in a number of ways:

1. Occasions arise in all teaching laboratories when it is desired to demonstrate various phenomena which for one reason or another cannot be performed by the students themselves. The biggest drawbacks to such demonstrations are usually a discouraging cluster of students around a demonstration table and the lack of permanent records for further study and discussion by the student. With the interwiring system in use in our laboratory, coupled with a public address system, each group of four students sits at its own Polygraph unit and watches as the demonstration recording is made and described before their eyes. Moreover, each group has a permanent record at hand for further study.

2. The wiring system is so arranged that any Polygraph can be used as the master or as a remote unit.

3. In the event that one or more groups lose their animal during an experiment, at a time when it would be impractical to start a new preparation, they can connect their Polygraph to any of the other units in the laboratory and thus obtain suitable records for study and discussion.

4. During the course of many experiments, a particularly unusual response occurs. This response can be reproduced with all units connected to the Polygraph at which the response is being recorded. In this way it becomes part of the permanent record for all students.

5. The use of a 4-channel tape recorder in conjunction with the interwiring system is currently under consideration. With this technique, a tape collection of various normal and pathological physiological recordings would be available for integration with the regular student laboratory procedures.

The interwiring system is shown in Chart 2. The circuit used consists of four separate push-pull cathode follower amplifiers plus their power supply. These amplifiers convert the high impedance input taken from pin jacks J_1 and J_2 on the Grass Driver Amplifier to a low impedance (about 1,000 ohm) output. This low impedance output serves two purposes: many recording units may be connected to it in parallel without loss in output, and the output cables do not need shielding. It is only necessary to connect the output from each channel to pin jacks J_1 and J_2 on the Driver Amplifiers of each remote unit. Twelve wire intercom cable may be used for this purpose, the remaining wires serving for a ground and for interconnecting the event marker pens.

The input to the amplifier is very sensitive to hum and is best wired with four lengths of broadcast audio cable (two-wire cable with an outer shield). The Driver Amplifier on the master Polygraph is left in the *Use* position, and those on the remote-units are set to the *Cal* position (*Adj* on older models).

The amplifier is very easily wired, but care must be taken to keep the grid leads short and shielded. In order to reduce hum it may be necessary to use selected 12AX7's or to use premium type tubes such as ECC83's.

Chart 3 shows a reproduction of original records taken from the Polygraph at which the recordings were being made (left half of chart) and from one of the remote units (right half of chart). The experiment involved the effect of epinephrine on the simultaneously recorded carotid artery blood pressure, myocardial contractile force, heart

rate, and ECG. The integrating cardiotachometer used for continuing registration of heart rate has been described in the literature (3) and can be plugged into the Grass 5P1 Preamplifier directly. The input signal to the cardiotachometer can be taken directly from the J_5 pin jack on the driver amplifier of the channel recording either blood pressure or myocardial force. This unit can be constructed at a parts cost of less than $50.00.

It can be seen from Chart 3 that the master and remote units give essentially identical records. Any differences in amplifier sensitivity is automatically accounted for by the calibration signals (originated at the master unit) that preceed the recordings. It should be noted that the speed change from slow to fast recording is a manual operation performed by individuals at each machine, and therefore do not correspond in time.

COST OF INSTALLATION AND MAINTENANCE

A. Basic recording equipment and transducers.—Each Polygraph unit including four driver amplifiers, four Model 5P1 Preamplifiers, four oscillograph pens, one event marker, six-channel console, two Statham P23AC pressure transducers, and one Grass FT-10 force transducer costs approximately $3,330.00.

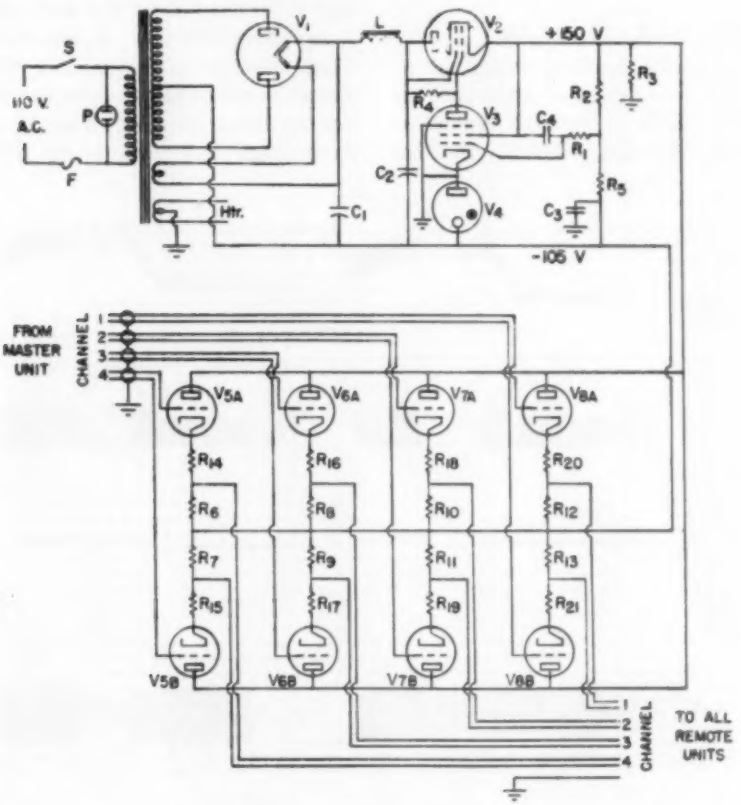


CHART 2.—Amplifier and interconnection circuit diagram for interwiring Polygraph units. V_1 = 5Y3; V_2 = 6AQ5; V_3 = 6AU6; V_4 = OB2; V_{5-8} = 12AX7 or ECC83; C_{1-2} = 40–40/450V; C_{3-4} = .02/600V; R_1 = 1M; R_2 = 150K; R_3 = 22K, 2 watt; R_4 = 220K; R_{5-13} = 100K; R_{14-21} = 680 ohm; L = 8H/50ma; S = SPST; F = 1A fuse; P = neon pilot; Transformer = 650 V CT at 55 ma, 6V at 3A, 5V at 2A. All resistors are ½ watt, 1 per cent unless otherwise specified.

B. Interwiring circuit.—Parts cost for this system including amplifier, cable, and connectors amounts to approximately $100.00 for our laboratory, with twelve Polygraph units.

C. Maintenance.—Projected for twelve units, and based on 1 year operation of nine units, maintenance and replacement parts on the Polygraphs and transducers should amount to approximately $150.00. This does not include any estimate of eventual replacement of transducers with time. We have found the transducers to be rugged units, capable of withstanding hard usage. Our only costs have involved replacement of plastic domes on a few of the pressure transducers.

DISCUSSION AND SUMMARY

After 2 years of experience with the recording techniques described above, we are most enthusiastic in our over-all evaluation of the increased teaching efficiency that has resulted in the Medical Physiology laboratory course. Advantages have accrued for both staff and student. The latter (although he is not really aware of it) is no longer frustrated by inadequate equipment which constantly requires adjustment and servicing. He has learned to handle modern recording equipment and has gained at least a small insight into its basic operation. More importantly, he has been able to devote his full time to the task of obtaining accurate recordings of functional phenomena, which can then be used for the only purpose that can really justify the time spent in a physiology laboratory, viz., the study and comprehension of physiological mechanisms and their application to medicine. It has been our experience that the average student group completes an experiment in two-thirds the time used previously. The quality and accuracy of measurements are far superior to those obtained from kymographs. Recordings and evaluation of dynamic

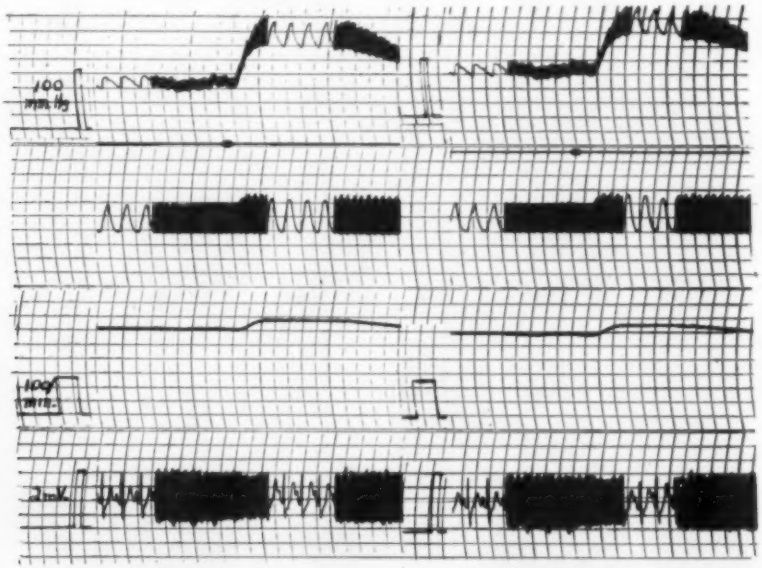


CHART 3.—Illustration of remote recording with interwiring system. Left half of figure recorded at master unit; right half recorded at remote unit. Curves from top to bottom are: (1) carotid artery blood pressure; (2) event marker signalling intravenous injection of 1 microgram/kg epinephrine in a vagotomized dog; (3) myocardial contractile force from strain gauge arch sutured on right ventricle; (4) heart rate recorded from integrating cardiotachometer; (5) ECG, Lead 2. Paper speeds: slow segment—1 mm/sec.; fast segment—25 mm/sec.

events, such as arterial and cardiac pressure pulses, are now possible. As a result of these and other factors, a great increase in quantitation of experiments has been achieved. The time gained is routinely used in small conference groups which follow the laboratory period directly.

The staff has derived many benefits from this reorganization of the laboratory course. Complete revision of the laboratory manual was forced upon us. This is a job which many departments often talk about doing, but seem to put off year after year. Our first stage in the reorganization of the laboratory manual was simply to rewrite all experiments as they would be performed with the new recording techniques. In addition, new procedures were included in many experiments. On the basis of 2 years' operation in this manner, the next stage will be the addition of new experiments that are now technically feasible with the recording equipment available. The staff has also gained greatly by being freed from the time-consuming job of technical maintenance of equipment during laboratory periods. They are now free to spend the entire laboratory period as instructors in the full sense of the word.

REFERENCES

1. Geddes, L. A.; Hoff, H. E.; and Spencer, W. A. The "Broadcast Demonstration" in the Physiology Laboratory. J. M. Educ., **34**: 107–17, 1959.
2. Hoff, H. E.; Geddes, L. A.; and Spencer, W. A. The Physiograph—An Instrument in Teaching Physiology. J. M. Educ., **32**:181–98, 1957.
3. McCook, R. D., and Peiss, C. N. An Integrating Cardiotachometer for Optical or Pen Recording. J. Appl. Physiol., **14**:473–74, 1959.

Some Effects on the Clinical Faculty of a Critical Incident Study of the Performance of Students

FREDERICK HERZBERG, PH.D.,* SCOTT INKLEY, M.D.,†
AND WILLIAM R. ADAMS, M.D.‡

Group Clinic University Hospitals and the Division of Research in Medical Education, School of Medicine, Western Reserve University, Cleveland, Ohio

During the fourth year of the program of the School of Medicine of Western Reserve University, each student is expected to spend 8 weeks, 5 mornings a week in a Group Clinic. This clinic was established to provide fourth-year students with the opportunity to assume a large degree of responsibility for the diagnosis and care of ambulatory patients in an environment that offered supervision from several branches of medicine. Here the student gets a taste of what practice will be. Patients are referred directly to the Group Clinic from the Intake Clinic of the Out-Patient Department without selection, the only requirement for admission being that their complaint merits a complete case study. The patient load consists mainly of adults and a few adolescents and is divided between working up new patients and following up old ones. This enables the student to observe the early symptoms and signs of a wide variety of illnesses. He sees the interaction of the illness on the patient's life and of the patient's life on the illness. He acts as a responsible member of a medical group working with consultants, nurses, and social service workers in a facility that is designed for inter-professional education in health service and patient care. He is expected to develop a sense of continuing responsibility for the patient as a person and for the management of the patient's case outside the hospital. He experiences the necessity of approaching the patient as a total person, with empathy but without emotional exploitation of the patient. More concretely, he practices the techniques of the physical examination, history taking, and the complete case study of an ambulatory patient.

The instructor-student ratio is purposely kept very high. Internists, a surgeon, and a psychiatrist (1) are available at every clinic session. A gynecologist and a dermatologist are regularly "on call," while other medical and surgical specialists are readily available. Other members of the staff include a clinic nurse and a public health nurse, a social worker, and, on a part-time basis, a psychologist.

The Group Clinic was started as one of the teaching units within the larger experiment of the revised philosophy of medical education implemented by a new curriculum begun in 1952 (5). Judgment of the success of this clinic as a teaching procedure within the framework of the total Medical School program must await a comprehensive study of the whole experiment, but the more limited and practical problem of the evaluation of student performance within the Group Clinic is of immediate concern to its teaching and administrative staff.

The experience the student receives in the Group Clinic represents in model form a part

* Professor, Department of Psychology.

† Assistant Professor, Department of Medicine.

‡ Assistant Professor, Division of Psychiatry.

of a medical education which is far removed from the traditional classroom instruction of formal education. Since the student is placed in the role of the physician, his performance in this situation is in part a measure of the validity of the preclinical and early clinical teaching of the school. Evaluation of the student's performance at the clinic has a significance beyond the efficacy of this particular clinic and becomes a meaningful criterion for the curriculum. Because of this potential significance, the Division of Research in Medical Education, which was primarily established to investigate problems of medical education, early focused its attention at the Group Clinic and more specifically at the problems of the assessment of student's performance there.

The evaluation of students operating in a clinical setting such as the Group Clinic highlights many of the traditional problems of performance review—the lack of standardization of tasks, the nebulous nature of most criteria of performance excellence, the difficulty of differentiating personality from performance, the reliance on evaluator judgment, the pooling of judgments, and the failure to provide a sufficient systematic procedure for observing students in the performance of their tasks. The results of evaluation in such a situation are generally ratings that are contaminated by halo, the spread of ratings is constricted by errors of central tendency and leniency, and there is a low over-all reliability of the ratings. The validity of these judgments is generally too low to consider seriously. Such anticipated results were demonstrated for this School of Medicine in a study recently conducted by Brozgal (2) which was concerned with predictive variables for medical school success. As one criterion of medical school success, Brozgal chose to use faculty ratings of students' traits. When he intercorrelated the ratings that were given by different members of the faculty for students on the various traits of the scale he found that the average reliability of the results was not significantly greater than zero.

As a consequence of the failure of ratings of clinical performance to provide at least reliable results, there is a tendency for the whole area of performance evaluation to come into disrepute. This is unfortunate, since a reliable and valid method of reviewing the results of training is basic to any educational program. Without such a review procedure, objectives cannot be tested, and changes in curriculum, teaching methods, and student guidance must all depend on a vague "educated guess" or "experience." These latter two criteria can be notoriously deluding.

It is an interesting fact that, in the training of teachers, little consideration is given to the problem of how to evaluate the results of their teaching. Evaluation in professional schools is generally based on subject-matter examinations and faculty ratings of student performances. Most of the teaching faculty of our professional schools have little training in either of these methods. Reasons for this deficiency include a lack of awareness of the technology in evaluation that has developed, failure of this technology to demonstrate general excellence, and—perhaps of greater significance—the implicit assumption that, as an expert in the field, the teacher knows good from poor performance. These factors are more true of rating procedures than of achievement testing, but it is just such methods that provide the bulk of evaluation in the clinical years of medical education.

Improvement in the evaluation of the clinical performance of medical students is then faced with three barriers: the general disrepute of evaluation procedures, lack of training in such evaluation, and the absence of adequate criteria of performance proficiency. To improve evaluation, efforts must proceed along two parallel lines: the development of criteria and the education of faculty to use them. The training of faculty must provide for an understanding of the importance of good evaluation as well as for the understanding of the process of evaluation. It was with these two goals in mind—the development of criteria of student performance and the training of the faculty—

that a critical incident study of student performance was initiated by the Group Clinic. The critical incident technique as employed in this study is an outgrowth of research in the Aviation Psychology Program of the United States Air Corps in World War II. Since that time critical incidents have served successfully as a means of developing performance criteria for a wide variety of tasks, including those of Air Corps officers, air route traffic controllers, government research personnel, teachers, dentists, nurses, industrial hourly workers, industrial supervisors, bookkeepers, life insurance agency heads, and sales clerks (3).

A critical incident can be defined as an item of performance, an occurrence with clear-cut facts attached to it. It is something that the student does or fails to do that results in failure or success in a particular part of his job—technical, interpersonal, or organizational. To be "critical" an incident must not only be some behavior that the instructor observes, it must also be some behavior that clearly shows either outstanding or less than satisfactory performance. Those performances which are carried out in acceptable manner by almost all individuals are omitted. In a critical incident study there is a systematic collection and analysis of hundreds and even thousands of such incidents, which when properly categorized and edited provide a list of many of the important behavioral requirements of the medical student for the group clinic situation. The fulfillment of these requirements can then be used as one of the criteria of performance proficiency in the evaluation of a student. The evaluation process thus changes from general impressions to systematic observations from what is he *like* to what does he *do*.

The following two critical incidents obtained from the Group Clinic illustrate the kind of data which permits an objective evaluation of performance without the intrusion of comments on the personality of the student or of explanations of his behavior.

Incident No. 60.—Group Clinic.—Ineffective.—

1. What led up to this incident? The student was asked to check a patient for a heart murmur.

2. Exactly what did the student do? At the beginning the student could not find the first sound, and then when he tried to time the heart murmur he became confused. When the instructor tried to help him by suggesting palpation of the carotid artery he observed that the student was unable to find it, looking for it posterior to the SCM muscle. Further query by the instructor brought out the fact that the student was not familiar with the concept of tracing a murmur by listening to the heart and feeling the carotid artery.

3. Why was this ineffective? This showed a serious lack of knowledge of technique and physiology for a medical student about to graduate.

Incident No. 31.—Group Clinic.—Effective.—

1. What led up to this incident? The student was given a patient who had come to the clinic with a major complaint of impotence. The case turned out to be extremely complicated and confusing, with many sociological and psychological implications, particularly since the patient had recently been parolled from prison.

2. Exactly what did the student do? Although the student did not at first comprehend what was going on he concentrated on getting all the details and writing a history so completely that a consulting psychiatrist was able to easily understand the total situation.

3. Why was this effective? There was a great danger of the patient's going into a severe psychotic reaction. Because of the student's approach, proper and immediate psychiatric attention was possible.

Over 100 incidents were obtained during a pilot study to determine the feasibility of continuing with a large-scale project throughout the School of Medicine. A personal interview with approximately 30 regu-

lar and part-time staff personnel of the clinic was utilized to collect the data. During each interview the respondents were briefly acquainted with the method and the purpose of the study. In addition, a majority of the doctors had received a more complete indoctrination at a number of staff conferences dealing with student evaluation. The questions asked to elicit critical incidents were:

1. Tell me the last time you observed a student behave or perform in the Group Clinic in such a manner that you felt he deserved high praise for what he did.

Probes: *a*) What was the situation?
b) What exactly did he do?
c) How did the student's behavior differ from behavior that you consider acceptable but not outstanding?
d) What were the consequences of his behavior?

2. Tell me the last time you observed a student behave or perform in the Group Clinic in such a manner that you felt he deserved to be highly criticized for what he did.

Probes: *a*) What was the situation?
b) What exactly did he do?
c) What should he have done?
d) What were the consequences of his behavior?

3. Now can you tell me of any other recent incident, either effective or ineffective, that you observed?

While it is possible and sometimes desirable to focus on incidents in specific areas, e.g., history-taking, physical examination, choice of laboratory work, diagnosis, and patient management, in this pilot study the question asked was very general, and the respondents were free to choose the specific area for their incidents as well as the number of incidents. No individual student was being evaluated at this time. We were primarily concerned with teaching the method and obtaining incidents preparatory to a more extensive survey which we hope will result in an established performance review by the way of the recording of critical incidents on students as part of his formal evaluation record. It is not, therefore, the purpose of this paper to describe the results of a completed critical incident study of medical students, but rather to describe certain changes in the attitudes and activities of many of the faculty members regarding their approach to the evaluation of a student which occurred partly as a result of the staff's experiences in participating in this pilot investigation. It is the purpose of this paper to indicate the value of a critical incident study in the *training* of the faculty to make better performance assessments of students.

Perhaps of greatest significance has been the insight and understanding the instructor physician has gained about the nature of the student evaluations that he is called upon to provide. One important change has been an increased understanding on the part of the instructor that the evaluation of a student after 8 weeks in the clinic is better built up from a series of on-the-spot specific evaluations than one based on a total recall global opinion. As one instructor commented to the interviewer, "It makes you think about the basis of your evaluation. I wish I had been able to recall the incidents that I observed when I was asked to make evaluations of students after the completion of their time here. I wonder now on what I was making my judgments." Another instructor commented to the interviewer, "It's funny that I find difficulty in giving you incidents, when there are hundreds that I should be able to recall. I guess if you don't record them when they happen or soon afterwards, they are lost data for you." In the busy day of a doctor, specific examples of student behavior are soon forgotten. What then is left after 8 weeks when the instructor is asked to evaluate the student? Not long after the collection of the critical incidents began it was observed by the interviewer that the first informants had to struggle to recall the events they had observed, but, as a result of the indoctrination lectures given to the instructors and the informal discussions which occurred among the staff, the

later interviewees arrived at the sessions armed with written critical incidents. These critical incidents, written at the time they occurred, of course provided much better data. A number of instructors have continued to record critical incidents for their own use.

Another area of performance review in which the instructors at the Group Clinic have gained some insight is the effect that halo has had on their previous student evaluations. General impressions made by a student often determine the evaluations made on all the specific parts of a performance review scale. The various aspects of a student's performance are then lost in the generalization based upon the general impression. The insight gained by one instructor is illustrated by the following comment. "After giving you these incidents, I am struck by the fact that I have related effective performances done by students that I have considered rather dimly. And, conversely, I have given you ineffective incidents about students whom I believe to be excellent." This instructor has observed for himself an excellent lesson in how halo operates. There is no doubt that he understood intellectually this problem of performance review. Now this problem has concrete meaning for him.

Probably as a reaction to the specificity of his terminology when discussing medical phenomena, the physician is quite apt to veer to extreme generalities when discussing subject matter foreign to his training and direct work. That this appears extensively in the evaluation of student performance was one of the major difficulties the interviewer faced when attempting to elicit specific critical incidents from the instructors. The tendency was to summarize and generalize an incident to such an extent that no incident in fact was given. For example, a faculty member (interviewee) would start by relating that just the other day a student performed in an exceptionally effective manner while taking a case history from a patient. When pressed by the interviewer for what he did in taking the case history that made it so effective, the instructor would reply that "the student carried it out in a complete, organized, and straightforward manner, and followed this with an excellent summary report to the staff." When pressed further by the interviewer for more specific details, the instructor often had difficulty relating anything more than he had said, except perhaps a paraphrasing of his original statement with other abstractions. One doctor told the interviewer that he was so accustomed to talking in gross generalities about the nature of effective and ineffective medical practice, that he found it difficult to relate what happened in the more specific manner that was desired. He added that this difficulty was true of most of the doctors with whom he had discussed such problems. The fact that the evaluation of people by abstract summaries of behavior is as deficient in value as it is in the biological and physical sciences was another principle learned by some of the Group Clinic staff as a result of the pilot study. This principle, always intellectually understood and granted lip-service, is another which has gained concrete meaning as a result of this study.

The tendency to think of performance evaluation in general terms often masks specific critical incidents from the observer and serves as well to minimize the importance of the specific behavior to the over-all judgment of the student's work. This is clearly indicated by a brief exchange between an instructor and the interviewer. The instructor began his response to the interviewer's question by indicating what characteristics he believes are important for a good doctor. The interviewer explained that he was interested in a *specific incident* that was considered by the instructor to represent an exceptionally poor performance by the students. The informant proceeded this time to give one of the general summaries of an incident rather than describing what had happened. Once again the interviewer repeated his instructions, and this time it brought forth what appeared to be an excellent critical incident. When the interviewer indicated that

this was the kind of information he was seeking, the informant replied, "I'm surprised that you consider what I told you to be a 'critical incident.'" The interviewer answered that it was the informant who made the judgment not the interviewer. "Well, I believe the student was very ineffective in this case," replied the informant. "Then you do consider it a critical incident?" "Yes, I'm just surprised, perhaps at myself, that I have passed over in judgment things that are now called to my attention, which I should have thought more seriously about."

The evaluation of another person is often an unpleasant task. In the formal situation where the evaluation has some functional significance for the person being evaluated many instructors approach this task with such misgivings as to seriously vitiate the value of their assessment. This is particularly true when it is recognized that the basis for judgment is limited. Part of the difficulty lies in the task that the evaluator is called upon to perform. If it is an assessment of the person, then his reservations are quite in order. However, if it is the reporting of specific observations of performance, then he as the instructor should be considered a valid source for the reporting of student action. In addition, while he may not be a valid interpreter of the traits which underlie the student's behavior, he is, as a subject-matter expert, a valid judge of the quality of the performance. This point regarding performance evaluation was clearly grasped by one instructor who commented, "I'm glad that you are not asking me to judge the student but only his behavior in a specific situation. I think I can make a judgment about a specific performance, but I have always disliked judging the man on the limited contact that I have with him. This is an important distinction that your questions have brought out for me."

The use of physicians with full-time community practice as rotating visitant instructors for medical school clinics raises many problems of teaching. Paramount among these problems is how to capture and sustain the initial interest and motivation that these part-time instructors have for their teaching role. The regular faculty is constantly involved with theories and practices in education, and the part-time instructor frequently finds himself confused as to the changing goals and procedures of a teaching unit. One consequent result is that the visitant physician often plays a too passive role in his clinical teaching function.

The requirement of close observation necessitated by the reporting of critical incidents has led many of these visitants to become more active and has given them a renewed realization of the importance of their role as teachers. Early in the study one visitant remarked to the interviewer, "My role here is to consult with the students when they have problems. What you ask requires that I play a more active role. How can I judge if a student was effective or ineffective if I don't observe him directly?" One may very well ask how he could make such a judgment. That he did at the end of 8 weeks was an administrative necessity. Good teaching requires good evaluations, but to make a good evaluation of a student it behooves the instructor to concern himself with his teaching. If the critical incident study, by emphasizing the importance of evaluation, has served in a small way to increase the visitant's interest and motivation for more active teaching at the Group Clinic, then this secondary gain of the study ranks with the primary gain that is being sought—a list of the critical requirements of student performance to be used in evaluation.

One early effect of the critical incident study occurred among the non-medical staff of the Group Clinic—hospital and public health nurses, social workers, and secretaries. They were included as sources of critical incidents of the student-physicians' behavior, and their observations in the area of their competence were as valid and as valuable as the observation made by the physicians. The inclusion of the associated personnel in the study led to a feeling on their part that they could play a more direct role

in the education and training of the students.

In the highly status-structured atmosphere of a hospital, physicians often react defensively to evaluation by any non-medical personnel, and this attitude can be quickly imitated by the medical student. The critical incident procedure, however, limits the evaluations made by non-medical personnel to those areas where they are not only competent to judge the student's performance, but where they are probably the only persons to observe the behavior. Secondly, they are not judging competence but are reporting events. The whole premise of the critical incident method is to emphasize the reporting and description of performance with a minimum of evaluation of trait characteristics of those being evaluated.

Research on merit rating has pointed to the basic importance of rater-training for the reliability and validity of their ratings (4). Untrained raters make poor raters. Formal lectures on the problems involved in the evaluation of people's work suffer the usual academic distance that lectures have from practice, but in addition they are inadequate because the process of evaluation includes so many emotional components. The rater has his biases which he rationalizes and which determine his evaluation often to a greater extent than the performance of the person he is evaluating. The critical incident procedure has led the faculty to experience the pitfalls in rating and to observe the intrusion of their own personal biases to an extent that is not generally possible with the more formal methods of instruction. Those instructors at the Group Clinic who have participated in the critical incident study appear to have learned and accepted five principles of performance evaluation:

1. Evaluation is a continuous process, and a final assessment must be based on an accumulative record, rather than a general impression with the details forgotten. Cumulative evaluation is the critical incident procedure.

2. The intrusion of "Halo" or the predetermining of all characteristics and all performances of a student by a single impression becomes explicitly clear to evaluators when they are forced to consider each specific incident and to consider it as just a *sample* of the student's performance.

3. The requirement to think in terms of specific events also works against the easy way of escaping assessing performance by the use of vague generalities. The generalities frequently are used when observations have been poor and evaluations are required.

4. The requirement that the judge present solely specific events of a person's behavior and not a description of his traits eliminates to a large degree the confusion and accompanying non-valid contamination of superficial personality impressions.

5. When an evaluation takes the form of recording critical incidents, the problem of the natural reluctance to assess other people is diminished. First, no judgment is made of the person's capabilities or other traits, but rather a description of what he did. A student who failed to check whether a diagnostic test was completed or not did just that; there is no requirement to make the inference that he is *lazy, indifferent, forgetful* or any other trait characteristic that could possibly fit this act. Second, this is a description of a single event, and any generalization will have to be based on a consistency of behavior as manifested in a number of incidents. Third, the evaluator has less hesitancy about his judgment when he is able to document it with concrete examples.

A number of more substantive changes have occurred at the Group Clinic in addition to the education of the faculty into the principles of performance evaluation which appear to be partly due to the collection of critical incidents. Two of these have already been mentioned. Many instructors have adopted the procedure of recording incidents on their students during the entire 8 weeks as a means of checking on their progress as well as providing the information for the final assessment that each instructor is required to make at the completion of his term at the clinic. It was also pointed out

previously that some instructors have adopted a more positive attitude to their teaching role in the clinic.

The majority of the interviewees commented that they were limited in the number of incidents that they could relate, since they rarely have an opportunity to observe the student in contact with the patient. Many promising incidents have had to be discarded because the instructor could not describe the event with enough specificity since what he knew was either inferential or second-hand information. In one instance a part-time visitant volunteered to observe the performance of a physical examination of a patient by the student. The instructors have not observed the students' conduct, the history, or the physical examinations of the patients because it was believed that the student would be affected adversely by the instructor "watching over the student's shoulder." The importance, however, from the teaching standpoint of being able to observe the student's actual performance became increasingly evident during the pilot study.

A preliminary analysis of the first 100 incidents obtained during the pilot study shows the effects of the failure of instructors to observe the procedures of history-taking and physical examination. The majority of the effective incidents were classified in the general area of interpersonal relations, while the majority of the negative incidents were classified under the technical proficiency categories. Inasmuch as the instructor does not witness the history or the physical examination, he can report fewer incidents of effective technical performance. However, if the student has made a mistake or omission during the history or physical examination, this may come to the instructor's attention when he checks the student's examination as consultant, or through subsequent developments of the patient's case. The higher proportion of inter-personal relations incidents among the effectives occurs because of the proportionally fewer effective technical incidents that can be reported. With the reinforcement coming from the critical incident study plans are being made for careful observation of the physical examination by the instructors.

Another effect at the Group Clinic that appears to have come about because of the study is found in the nature of the staff's discussions of specific cases and the performance of the students. The thinking and language of the critical incident method have permeated these conferences with the result that the discussions appear to be more constructively oriented, and communications among the staff members are better. The similar use of critical incidents for reviewing cases with individual students has been found to diminish the student's anxiety and defensiveness. The student can accept and in most instances welcome a critique of a specific performance when this is done without attacking him as an individual.

A number of difficulties in collecting critical incidents arose during the pilot studies, difficulties which also served to demonstrate the value of a critical incident study in sharpening some of the tacit problems of teaching clinical medicine. It is to be expected that any medical teaching staff, particularly when recruited from part-time personnel, will show wide variation in knowledge about teaching and student evaluation. The critical incident procedure makes these differences manifest, since instructors vary greatly in their ability to give incidents. An instructor who is reluctant to evaluate may be able to avoid a student evaluation by saying he doesn't know the student well enough, but finds it hard to reject evaluation when he is asked to present specific incidents of effective or ineffective behavior. Cooperation from the staff of the Group Clinic has been nearly 100 per cent, but the variability in the ease, number, and quality of the incidents obtained from approximately 30 different instructors was great. Part of this variability can be attributed to differences in the comprehension of the procedure, but a large part appeared to be a direct reflection of the interest and motivation in their teaching job that the various personnel had shown in the 8-week assignment. It has al-

ready been suggested that in some instances the study has succeeded in raising the interest and motivation of part-time and ancillary staff. Every evaluation program must consider the effects on evaluation of the effort that instructors have put into their teaching and their observation of the pupils. Generalized rating techniques obscure this source of bias, whereas the critical incident procedure tends directly to reveal it. Since the critical incident method is partly a reflection on the instructor as well as the student, resistance to the method is to be expected. In the present study such resistance has been surprisingly small or else uniquely subtle.

Without doubt the greatest difficulty in conducting a critical incident study centers on the definition of "critical," "effective," and "ineffective." This is much more a rational problem than a practical problem, but the seeming logic of this question is so strong that an attempt to answer it occupies the largest amount of indoctrination time. This is particularly true for the evaluation of medical practice. The chronic argument that is advanced is that medical practice is such a large and amorphous thing that making judgments regarding its quality is an impossible task. The question is generally stated in the form of "What is a good doctor?", and in this form it must be considered a nonsense question. Both "good" and "doctor" as used in this manner are complete abstractions and defy any workable definition. The critical incident technique reduces the problem to specific kinds of behavior for which judgments should be easier to make. It does not necessitate agreement on what constitutes a global effective practice, but it does open the way for more agreement on specific aspects of medical practice. This is in fact the actual procedure that is generally followed by physicians in the multitudinous evaluations that they constantly make. The critical incident procedure is a more objective and systematic approach to a method of evaluation that already exists. Perhaps the reluctance to accept this on the part of many physicians is the unrecognized feeling that a "good doctor" exists in a platonic perfect idea and that any pragmatic definitions reduce its status. Medical practice is an accumulation of specific doctor behavior incidents, and its evaluation must be an assessment of each of these reactions.

In summary, this paper is concerned with the many secondary gains that appear to have resulted from a pilot critical incident study of student performance at the Group Clinic of the Western Reserve University School of Medicine. Among the gains listed are more positive attitudes toward student evaluation, better understanding of the process of evaluation, and some modification in the procedures followed at the clinic. These benefits arise from the nature of the critical incident technique, particularly the method's emphasis on specific behavior, and the need to involve the faculty directly in the conduct of the investigation. A critical incident approach to medical student evaluation seems to be highly desirable, if for no other reason than for the secondary effects that will be forthcoming.

REFERENCES

1. ADAMS, W. The Psychiatrist in an Ambulatory Clerkship for Comprehensive Care in a New Curriculum. J. M. Educ., **33** (3), 1958.
2. BROZGAL, J. L. Evaluation of the Clinical Performance of Medical Students. Unpublished Doctoral Dissertation, Western Reserve University, 1957.
3. FLANAGAN, J. C. The Critical Incident Technique. Psychol. Bull., **51**:328–58, 1954.
4. GUILFORD, J. P. Psychometric Methods, New York: McGraw-Hill, 1936.
5. WEARN, J. T. Background and Philosophy of Experiment. J. M. Educ., **31** (8), 1956.

Well Baby Clinics in the First-Year Medical Curriculum

The Family Medicine Course at the University of California at Los Angeles

ARTHUR H. PARMELEE, JR., M.D., LONIS LIVERMAN, M.S.W., NATHALIE KENNEDY, M.S.S., MIRIAM G. WILSON, M.D., AND JUSTIN D. CALL, M.D.

Departments of Pediatrics, Preventive Medicine and Public Health, and Psychiatry, University of California, Los Angeles, Calif.

The ultimate goal of the student entering medical school is caring for patients. The long and difficult learning processes involved in preparing for the practice of medicine are hard to visualize or comprehend until one is actively engaged in them. In the beginning, the student has neither sufficient knowledge nor skill to render care to patients. For this reason, the first 2 years in medical school are generally devoted to studies in the basic sciences and ultimately to an introduction to physical diagnosis. These are the "pre-clinical" years. In most medical schools it is in the last 2 years that the students first begin to deal directly with patients. At this point, their participation in patient care is the major stimulus to learning.

There has always been concern about the proper sequence of the medical school curriculum (1, 4, 8). Recently, there has been concern that the deferment of patient contact until the last 2 years of medical education may interfere with optimum learning from participation in the medical care of patients (5). A little evidence has been accumulated to support this concern (6), and several medical schools have introduced courses that permit student-patient contact in the first year of medical education (2, 6, 7).

Well Baby Clinics offer an opportunity to provide student-patient contact within the first year of medical school in a situation generally free of complicated illnesses. The parents of the babies are, however, concerned about human relationships and the maintenance of good health in the infant. The students can understand and cope with these concerns if given adequate guidance. This gives the student immediate opportunity to help patients in a limited way and bridges the gap to the more complicated relationships they will have later with sick patients in the clinics and on the wards.

THE FAMILY MEDICINE COURSE

The first year of the Family Medicine Course of the University of California at Los Angeles is conducted in city and county well baby clinics. This course starts in the first semester of the first year and continues, in different phases, through the four years of medical education (9, 10).

The course has as its major objective the development in the medical student of a broad concept of the social history of the patient and the relevance of the social history to rendering optimal medical care. The basic assumption is that full knowledge of the patient's family history permits the most

favorable communication between the patient and the doctor. This kind of communication, in turn, aids in the medical diagnosis of the patient's problems, the explanation of the condition to the patient, and the patient's ultimate acceptance of the appropriate treatment. When necessary, the patient's treatment may be properly adapted to his social and cultural background, his desires, beliefs, and feelings.

Considered as pertinent to the social history of the patients in this course is the following information:

1. Family constellation: names, ages, and sexes of immediate family and other household members; also, duration of the marriage and length of residence in the community.

2. Family cultural background: race, nationality, ethnic and cultural traditions, religion, parents' family background, and educational level of the family members.

3. Family characteristics: housing, neighborhood, employment of family members, family motility, and health of family members.

4. Current family social situation: intellectual interests, hobbies and other activities, family unity of interests or diversion of interests, and family attitudes toward health and medical care.

5. The family's relationship with the community: school attendance, church affiliation and activities, recreational activities, club and civic activities.

In the first year of medical school each student is assigned a family in a special well baby clinic in a city or county district health office.[1] The student visits this clinic every month when his family attends with their baby. He also makes three or more home visits during the year. In his contacts with this family, he obtains a detailed social history of the entire family, as previously indicated. The social history is presented to the clinic physician and to the other students attending that day before the family and child are seen. The clinician then immediately makes use of this information in his dealings with the family by pursuing some of the mother's questions in greater detail and by adjusting his discussion and recommendations to her social and cultural needs. In this manner, the students can see, by the clinician's demonstration, that the social histories they have obtained are significant and functional in rendering medical care in the well baby clinic.

Once a month the entire class convenes for a case conference. Except for the first two sessions, which are didactic orientation lectures, the case presentations are made by the medical students. The students discuss the case, aided by the instructors and occasional invited guests. The cases presented are selected to illustrate general concepts that will emphasize the major objective of the course.

In the second year in medical school the student has three well baby clinic appointments with the family, because the children are past one year of age and are seen in the clinic once every three months. Home visits are continued as in the previous year. During this year, the relationship between the student and his family becomes stronger as both become better acquainted with each other. If medical problems arise in the family, counsel is often sought from the student to support them in seeking medical care or in carrying through with treatment prescribed by their physician. The student does not treat the patient, nor does he make medical diagnoses. The patients know his status as a student. He is regarded by the patient as an informed confidant in medical matters and in other family problems and as a liaison with the well baby clinic and other community resources.

In the third year of medical school, one well baby clinic visit is planned for the student, and he is encouraged to follow his family by home visits. No clinic visits are planned in the fourth year, but some students maintain contact with their families

[1] The pediatric instructors in the special well baby clinics are Dr. Arthur H. Parmelee, Jr., and Dr. Miriam G. Wilson of the Department of Pediatrics, and Dr. Justin D. Call of the Department of Psychiatry, of the University of California at Los Angeles School of Medicine.

by home visits and phone calls. Approximately one-half of the students follow their families through the fourth year.

The families receive their medical care from private physicians, through other community clinics, or at the University of California Medical Center. Approximately one-third of the families receive some care at the University Medical Center. When this occurs, the medical student is able to participate in the care of the patient to some degree, depending on the stage of his medical training.

At the end of every year, each student is required to submit a report of his observations of his family. The report at the end of the first year is the most complete in that it contains all the basic social history of the family. Subsequent reports contain revisions of previous observations, additional social history, and interval progress notes. When the student and family discontinue their relationship, the student is asked to state the reasons.

Special well baby clinics for this course are located in the city and county health department facilities, and, as previously stated, families for the course are selected from the regular well baby clinics. The course is explained to prospective families, and only those who wish to participate are included in the program. In the special well baby clinics, only six to eight families are seen in an afternoon. All the students assigned to families that will be seen on a given afternoon are present when the clinician examines each baby and interviews the mother or both parents. The families are discussed with the students before and after each examination.

Additional phases of the Family Medicine Course, which have been described elsewhere (9, 10), are designed to give a continuum in following child development from the well baby clinic through elementary school, and to aid students in extending the concepts developed in the first 2 years to the daily care of their patients in the clinics and on the wards in the last 2 years of medical school.

METHODS FOR EVALUATING STUDENT PROGRESS IN THE FIRST YEAR

1. A verbatim record was kept of all the questions asked by the students at the monthly class conferences. At the end of the year, these questions were classified as those related to:
   a. Course procedure, such as appointments with families, requirements of the course, etc.;
   b. The students' relationship to the families, such as the nature and extent of their role and consideration of professional ethics and conduct;
   c. The families' relationship to the students and to the course, reflecting concern as to how much the family understood the program and why they wished to participate in a student teaching program;
   d. Techniques for establishing rapport with the family and methods of eliciting the social history;
   e. The social history of the family presented;
   f. The medical history of the family presented.

   These were believed to reflect the changes in orientation and understanding of the group as a whole as their learning progressed.
2. The family reports submitted by each student at the end of the year were all read and scored by two people. The clinic doctor read and scored only the reports from the students attending his well baby clinic. The social work instructor read and scored all reports. The scores of the two readers were averaged to obtain the final score. The records were rated 0 to 4 for completeness of each of the five items of the social history indicated earlier in the course description. The maximum score obtainable was 20.
3. During the academic year, in eight of the twelve monthly well baby clinics, a social work instructor[2] kept written notes of

[2] The social work instructors are Miss Nathalie Kennedy and Mrs. Lonis Liverman of the Department of Preventive Medicine and Public Health of

student participation in the discussion and of other expressions of their interest. From these notes of the monthly clinic visits, the 32 students in the eight groups were rated. The rating scale was as follows:

Seldom interested	Score 1
Interested some of the time	Score 2
Interested most of the time	Score 3
Very interested all of the time	Score 4

The interest scores were then correlated with the scores attained on the written reports.

4. Each clinic doctor rated the mothers attending the clinic as to relative communicativeness on the following scale:

Hesitant to respond to questions	Score 1
Responds to questions with minimal elaboration	Score 2
Talks readily about self and family with questioning	Score 3
Talks readily about self and family without much questioning	Score 4

It was thought that this factor might significantly affect the students' ability to submit a complete report. These scores were correlated with the scores on the students' reports.

5. The grade point averages of each student for all the first-year courses were correlated with the scores attained on the family reports.

RESULTS

Analysis of the questions asked at the class case conferences revealed a progressive shift in focus. As might be expected, initially the students were primarily interested in course procedures and in their relationships to the families and the families' interests in them. Most of this concern coincided with the assignment of families in September and October and with the first home visit that is usually made in November or December. At this latter time, there was also concern about methods of establishing rapport with the families, and how to elicit information.

By the end of January, most of the students had made a second home visit, and all had submitted a preliminary family report. From that time on, questions at the case conference tended to center around the social history or medical problems of the case presented (Table 1).

The first two conferences were primarily orientation sessions and tended to elicit specific categories of questions. The first family case presentation was made by a senior medical student which gave the first-year students an opportunity to hear from an upper class member his total experience with his family. Such questions as the following were typical:

With regard to your relationship to the family, I got the impression they had a very close relationship with you. Do you feel this kind of relationship should be cultivated or should one be more conservative?

Did you find that, as your medical education progressed, your relationship with the family shifted a bit regarding medical problems?

When you first started, did you gather most of your information by observation?

Would you say they were friendly in that they kept the conversation going?

All the subsequent family case reports were presented by members of the first-year class. These six presentations gave comparable stimulation for social history and medical questions except for the December presentation, which was focused more on the problems of rapport and communication. As previously indicated, the students' questions became increasingly oriented to the social and medical history of the families as the year progressed.

The family reports submitted by the stu-

the University of California at Los Angeles School of Medicine.

dents at the end of the first year were reasonably complete relative to the five items in the social history for which they were graded. There was a fairly normal distribution of the scores. The mean score was 11.5 and the median score 11.4, with a standard deviation of 2.6 (Chart 1).

The 32 students in eight of the twelve clinic groups were rated on interest in the course on the basis of clinic observations. Nineteen students were definitely interested, and eight of these seemed to be extremely interested all of the time. Three students showed very little interest (Table 2). Seventeen students, all of those in the remaining four of the twelve clinic groups, were not rated in this manner. Unfortunately, a special observer was not available for these groups.

The scores of the students' reports were correlated with their interest rating. Those students who were rated as showing greater interest showed a definite tendency to have higher scores on their reports (Chart 2).

It was felt that some mothers were significantly less communicative than others and seemed to require greater effort and a more skillful technique on the part of the

TABLE 1

AN ANALYSIS OF CLASS CASE CONFERENCES BASED ON CATEGORIES OF QUESTIONS ASKED

Monthly class conference (No. students—49)	Total no. questions	Course procedure	Student relationship to family	Family relationship to student and course	Development of rapport and communication	Social history	Medical
Sept.—Orientation Lecture	6	2/6		3/6		1/6	
Oct.—"The Family in Our Society."—Lecture by a Sociologist.	3					3/3	
Nov.—Case: Mother a German war bride. Presentation by 4th-year student.	10	1/10	4/10	2/10	2/10		1/10
Dec.—Cases: 1. Talkative mother. 2. Quiet mother. Presentation by two 1st-year students.	8		1/8		1/8	6/8	
Jan.—Case: An adopted child. Presentation by 1st-year student.	5		1/5	1/5		3/5	
Feb.—Case: An adopted child. Presentation by 1st-year student. Discussion by Law Professor.	3		1/3			1/3	1/3
March.—Case: Mother with diabetes and healed tuberculosis. Presentation by 1st-year student.	11					3/11	8/11
April.—Case: Mother with a psychiatric problem and hypertension. Presentation by 1st-year student.	15					12/15	3/15
May.—Case: Japanese-American family with a large hospital bill and other medical expenses. Presentation by 1st-year student. Discussion by Hospital Administrator.	12			1/12		11/12	

interviewer to elicit significant information. The mothers were rated by the clinic physicians on a scale of 1–4, relative to this factor. It seemed probable that the students who had uncommunicative mothers might be the ones who submitted poor reports. However, there was no relationship between the students' grades on their reports and the clinicians' rating of the mothers' ease in communicating. It is probable that the material required for a satisfactory report could be obtained by observant and interested medical students who understood the purpose of the course regardless of the freedom of conversation of the mother. It is to be recalled that all of the families participated voluntarily and, therefore, were generally cooperative if not articulate.

An attempt was made to correlate the students' family reports with their grade point averages in all other courses. There was no apparent relationship. There were students with high grade point averages who submitted poor family reports and students with low grade point averages who submitted good family reports.

The only positive correlation with the score on the family report was with the student interest rating. It is noteworthy that the clinic observers were able to discern what appears to be an important evaluative item that has been called "student interest."

The students' scores on their family reports were tabulated highest to lowest and divided into quartiles. The average scores of the top quartile students were correlated with their grade point average in other courses, the communicative level of the mothers, and interest in the course, and were compared with those in the bottom quartile. The differences in the average grades in other courses and in the communicative level of

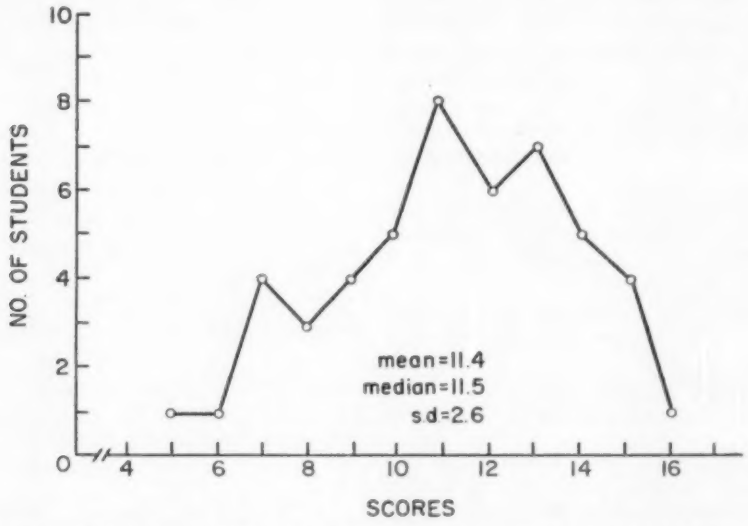


CHART 1.—Distribution of scores on students' written report on assigned family (highest possible score = 20).

TABLE 2

THE STUDENTS' LEVEL OF INTEREST AT THE WELL BABY CLINIC

No. students observed	SCORE 1 Seldom interested	SCORE 2 Interested some of the time	SCORE 3 Interested most of the time	SCORE 4 Very interested all of the time
32	3	10	11	8

the mothers were small in the two groups, though slightly lower in both instances for the bottom quartile. The difference between the interest ratings for the two groups was quite striking, with top quartile group being higher, as expected (Table 3).

COMMENTS

The evaluations reviewed in this report indicate that, although most of the first-year students were capable of obtaining a fairly adequate social history from one assigned family, their success in submitting a good social history did not correlate with their success or failure in their other courses in the first year in medical school. The latter courses are largely in the basic sciences. This would tend to confirm the concept that different motivations and learning processes may be involved. It is possible that the motivation for learning and the learning processes in this course are more like those operative in the last 2 years, the clinical years of medical school. This concept may be assessed when these students have completed medical school. It could be that one of the major functions of a course of this type is to keep the motivating forces that have to do with patient care active until the students are in their clinical years (1, 3, 6).

Since this course is planned as a longitudinal course involving all 4 years of medical school, it is not expected that the full goal will be achieved in the first year. The student is encouraged to continue to increase his skill in communication with, and his understanding of, his assigned family and then to generalize from this experience to his clinic and ward work where he deals with many patients for shorter periods of time.

TABLE 3

STUDENT REPORT SCORES IN Q1 AND Q4 AND CORRELATES

	Top quartile	Bottom quartile
Av. report scores	14.4	7.7
Av. grades in other courses	2.62	2.56
Av. communication leve of mothers	2.8	2.3
Av. interest level of the students	3.2	2.0

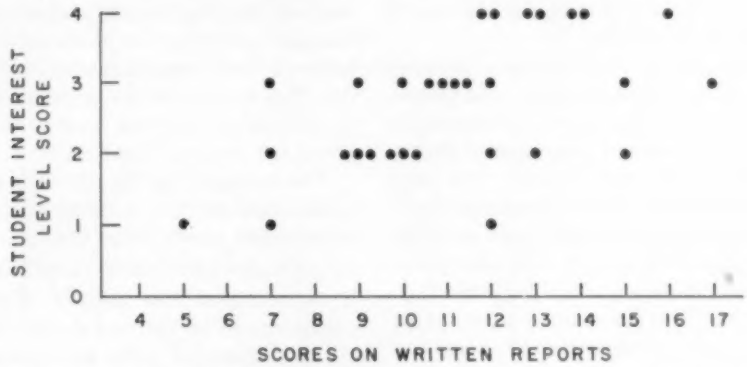


CHART 2.—Correlation of students' levels of interest at well baby clinic and the score received on his report of the assigned family.

Thus far only the major aim of the Family Medicine Course has been discussed. There are several important sub-goals in this learning experience that should be mentioned. The foremost of these is the concept of child development. The students have an extraordinary opportunity to observe the physical, neuromuscular, and mental growth, as well as the social and personality growth of the infant and young child, as they follow the development of the child in their assigned family.

The fundamentals of well baby care are obviously an integral part of the first-year Family Medicine Course. These include

such basic public health measures as immunizations for diphtheria, whooping cough, tetanus, poliomyelitis, and smallpox, and advice on nutrition including the prevention of rickets and scurvy and also preventive psychiatry in terms of discussions of child rearing practices in our society.

A more subtle, but nonetheless important, learning experience is related to the practical operation of a community health department. The well baby clinics are all conducted in public health department facilities in close cooperation with the health officers. The students also work very closely with public health nurses. In fact, the first home visit each student makes is with one of the public health nurses.

The sub-goals in the learning experience may not all be emphasized to the degree that some might wish, since it is essential to keep the major goal as a clear central theme. Nevertheless, they undoubtedly form solid background for later specific learning experiences in these separate areas, such as in the general Pediatric clinic, the well baby clinic for third year students in the Pediatric Outpatient Clinic, and the courses provided by the Department of Preventive Medicine and Public Health.

SUMMARY

Medical students on admission to medical school are highly motivated to participate in the medical care of patients, since this is their ultimate goal. There is some concern that the traditional deferment of student contact with patients until the last 2 years of medical school may deter the impetus of this motivation. Many medical schools are attempting to remedy this situation by providing student contact with patients in the first 2 years of medical school. This paper is a report of the use of the City and County well baby clinics for this purpose. Well baby clinics offer an opportunity for patient contact in a medical situation free of medical problems too complex for beginning students. In this situation, the importance of the sociological factors of family and community life as related to medical care can be readily illustrated in terms of nutrition, preventive medical care, and discussions of child-rearing practices.

In the Family Medicine Course at the University of California at Los Angeles each student is assigned a family in a well baby clinic. During the first year the student sees his family and observes the well baby care of the infant at each monthly visit to the clinic. He also makes home visits. The same family is followed through the second and third years, but less frequently.

An attempt has been made to evaluate the progress of the students in obtaining medical-sociological information about their families and in the use of the information to improve their communication with the family. This evaluation has been accomplished by an analysis of their final written reports about the assigned families.

The majority of the students submitted satisfactory reports in terms of sociological information about their families. The success of a given student in submitting a highly rated report was directly related to an evaluation of his interest in the course and did not correlate with his over-all grade point average in the first year of medical school.

Further evaluation of the students' progress by an analysis of the questions asked at the case conferences revealed a gradually increasing awareness on the part of the students of the meaning and objectives of the course.

ACKNOWLEDGMENTS

We wish to acknowledge the extensive help given us by the public health nurses and the district health officer, Dr. Dean Gilman, of the West Los Angeles Health District of the Los Angeles Health Department and the public health nurses and the district health officer, Dr. Robert Faust, of the Santa Monica Health District of the County Health Department, and the social service staff of the Medical Center of the University of California at Los Angeles.

REFERENCES

1. ALLEN, R. Medical Education in the Changing Order. New York: The Commonwealth Fund, 1949.
2. CAUGHEY, J. L. Clinical Teaching during Four Years. J. M. Educ., **31**:530, 1956.
3. DEWEY, J. How We Think. Boston: D. C. Heath and Company, 1933.
4. FLEXNER, A. Medical Education, A Comparative Study. New York: The Macmillan Company, 1925.
5. FRANK, L. What Is Involved in the Learning Process? Trans. Am. Ophth. & Otolaryng. Soc. (to be published).
6. MERTON, R. K.; BLOOM, S.; and RAGOFF, N. Studies in the Sociology of Medical Education. J. M. Educ., **31**:552, 1956.
7. MERTON, R. K.; READER, G. G.; and KENDALL, P. L. The Student Physician; Introductory Studies in the Sociology of Medical Education. Cambridge: Harvard University Press, 1957.
8. MORGAN, J. A Discourse upon the Institution of Medical School in America, 1765. Baltimore: The Johns Hopkins Press, 1937.
9. PARMELEE, A. H., JR., and LIVERMAN, L. The Elementary School in Medical Education. J. M. Educ., **33**:655, 1958.
10. PARMELEE, A. H., JR.; SWENGEL, E.; and ADAMS, J. M. The Family in Medical Education. Pediatrics, **14**:387, 1954.

Roswell Park Research Participation Summer Program
Implications for Professional Education*

EDWIN A. MIRAND, PH.D.,† GEORGE E. MOORE, M.D.,‡ AND JAMES T. GRACE, JR., M.D.§
Roswell Park Memorial Institute, Buffalo 3, New York

Every scientific profession has an inescapable responsibility to serve the public welfare and to perpetuate itself so as to meet the demand for its continuing services. In addition, there is an urgent need for a mechanism by which the administration and staff of every educational institution can adequately discuss their professional aims and the techniques required to achieve those aims. The fact that some professional personnel lose sight of those aims should be a major concern of the professions and those who educate for the professions.

The situation is now serious. Among the top 2 per cent of our high school graduates, only two-thirds are now going all the way through college. The number of persons earning doctorates at present is less than half of 1 per cent of the population. Furthermore, the number of engineers and scientists graduated annually has been decreasing in the United States since 1949.

For these reasons, discussions of means by which we at Roswell Park Memorial Institute might be able to make better utilization of our intellectual resources in talented students were undertaken more than 6 years ago. Administration and staff felt that one of the ways they could serve their professions was to offer a research participation program to talented high school, college, medical, dental, and graduate students, and to high school teachers.

Although many of us would doubt that every one who presumably has the learning capacity to be a scientist or physician should necessarily be encouraged, the fact that fewer than half of all high school students have motivation to pursue a profession was uppermost in the decision to establish our program. At the onset, we realized the importance of appreciating the students' point of view: making due allowances for their follies and extravagances, encouraging their good endeavors and assisting them in planning their futures.

HISTORY

The cancer research center now known as Roswell Park Memorial Institute was founded in 1898 by Dr. Roswell Park, Professor of Surgery at the University of Buffalo School of Medicine. The members of the staff of the Institute conduct clinical and nonclinical research in the fields of biology, chemistry, physics, and statistics. The Institute includes a division of the University of Buffalo Graduate School, making it a well balanced investigative and educational center. With its new and enlarged facilities, the Institute is well equipped for its investigation of the cause, prevention, and cure of cancer and allied diseases.

The active concern at Roswell Park Memorial Institute for the talented student at all levels began in the summer of 1953. Intensive study of this problem resulted in

* This program was supported by funds from New York State, Department of Health, United States Public Health Trainee Grant, and the National Science Foundation.

† Associate Cancer Research Scientist; Assistant Professor.

‡ Director of the Institute.

§ Assistant Director of the Institute.

a decision to establish a summer research program with the following primary objectives:

1. An understanding of scientific facts, principles, and practical techniques which are employed in an active research environment.

2. The acquisition of adequate skills, habits, and attitudes in the use of problem-solving methods that are involved in scientific investigations.

3. An appreciation of the ways in which the methods of science improve human welfare.

4. An interest in science as a vocation.

Since our first summer program in 1953, our program has been expanded in the seven years to an average of 88 participants annually distributed as follows:

High school teachers	6
High school students	26
College students	35
Graduate students	2
Dental students	2
Medical students	17
Total:	88

The growing awareness of our summer program on the part of high schools, colleges, and universities has resulted in more than 600 applications for admission each year. This enables us to be selective and to admit, for the most part, only superior students. Facilities limit the number of students that can be accepted to about 88 because of the individual attention that is required.

The cost of running this program is approximately $35,000 a year. From the start, support for the program has been obtained from the New York State Department of Health. Further support has recently been provided by grants from the United States Public Health Service, and more recently from the National Science Foundation. The staff donates its time to this program at Roswell Park Memorial Institute in Buffalo and at our Biological Station in Springville, New York.

METHOD OF SELECTION

Announcements of our summer program are sent out by December 15, and application blanks are sent to all applicants upon request. In the case of high school students, schools are asked to request applications only from students that are mature or show unusual initiative or accomplishment. The deadline for all applications is April 1. Applicants are requested to send a 600-word autobiography along with their applications. Such applications are reviewed not only by the Summer Program Committee at the Institute, but also by members of the staffs of several colleges and universities in the Buffalo area. Selection is determined by grades, recommendations of teachers or college professors, and the students' autobiography and previous experience. Applicants are notified of their appointments by May 1st. The participants finally selected come from schools, colleges, and universities in western New York as well as throughout the country. The program officially starts on June 1 for college and professional students, and July 1 for high school students and teachers.

The salary scale and length of appointment of those selected have been as follows:

A. High school students (maximum appointment, 2 months): juniors, $100 a month; seniors, $125 a month.

B. High school teachers (maximum appointment, 2 months): $300 a month.

C. Undergraduate college students (maximum appointment, 3 months): $150 a month.

D. Graduate, medical, and dental students (maximum appointment, 3 months): $200 a month.

In most instances, this salary scale has proved to be sufficient to cover the costs of transportation, lodging, and board. Outstanding students are requested to return. Usually, participation is limited to a tentative maximum of 3 years.

NATURE OF THE SUMMER PROGRAM

The selected summer participant is required to devote 40 hours a week to a research participation program under the di-

rect supervision of a senior staff member. Generally, a senior investigator is assigned one participant, thus making possible a preceptor-student relationship between the investigator and the participant. Placement is usually arranged so that each participant will work in a department closest to any special interest that he may have. Attendance is required at weekly orientation lectures given by senior staff members engaged in all phases of scientific research. A supplementary film series representing all phases of the sciences is included in the program but is scheduled so as not to conflict with the day's work. Seminars dealing with the nature of science are conducted by the summer program director.

TABLE 1

MAJOR INTEGRATED PROJECTS IN WHICH SUMMER PARTICIPANTS CAN ENGAGE AT ROSWELL PARK MEMORIAL INSTITUTE

Biology:
- A. 1. Biological and chemical characteristics of tumor cells as defined by immunological, cytogenetic, and tissue culture techniques.
- 2. Endocrine dependence of some neoplastic tumors in experimental animals.
- 3. Studies in viral, chemical, and radiation carcinogenesis.

Chemistry:
- A. Immunochemistry
  - 1. Study of chemical specificity of receptor sites in cells, including tumor antibodies and their physical chemistry.
- B. Biochemistry
  - 1. Nucleic acid metabolisms of virus-infected cells and of cancer cells.
  - 2. Steroid metabolism in various physiologic and pathologic states.

Physics:
- A. 1. Paramagnetic resonance spectroscopy and particle electrophoresis.
- 2. X-ray diffraction applied to crystalline proteins.
- 3. Instrument design and development.

Clinical Research:
- A. 1. Development of new surgical procedures and techniques.
- 2. The synthesis and clinical investigation of agents for chemotherapy.
- 3. Metabolic studies on cells and urine of cancer subjects.
- 4. Hematological investigations of neoplastic disease.
- 5. Statistical methods for the evaluation of chemotherapic agents and of epidemiological factors in cancer.

The summer participant is expected to make two progress reports concerning his activities in the program: one midway through the program and the other at the conclusion of his stay at the Institute. In addition, each participant is interviewed, and his experiences are evaluated by the summer program office every two weeks.

Major integrated projects in which participants can engage at the Institute are briefly summarized in Table 1.

Participants are encouraged to spend some time at the medical library at the Institute as well as at the University of Buffalo library and the Grosvenor Reference Library.

For out-of-town participants, the Y.M.C.A., Y.W.C.A., and the dormitories at the University of Buffalo provide housing accommodations. The Institute offers breakfast, lunch, and dinner in its cafeteria, and light refreshments in its Snack Bar.

REACTION TO SUMMER PROGRAM

When we assessed the integration of summer program participants into research work on various levels, we found that we were dealing with various degrees of orientation experienced by the participants in regard to their new environment and the challenges which confront them. Usually this initial uncertainty is soon replaced with active curiosity and energy, especially in the instances of our best participants.

For the most part, staff members involved have realized that this is a new experience for participants and have unfolded the complexities of this new experience according to the capacities of the student. Participants have been encouraged to take up their tasks vigorously. Those who have not met the challenge in this way have experienced complacency, stolidity, and boredom. Investigators have gone through a great deal of effort to identify skills that are necessary for the cultivation of an effective scientific attitude in our Institute. In this way, the participant is enabled to gain an explicit understanding of what our program is intended to achieve.

In the next few paragraphs, we propose

to indicate a few of the salient reactions characteristic of participants in our program. What follows is based upon spontaneous conversations, interviews, and seminars with summer program participants.

Participants' reactions (Table 2).—In a program such as ours, it is imperative that investigators emphasize and dramatize the difference between learning facts at school or college and at the Institute. In a research program, the individual utilizes his skills to obtain data leading toward the solution of a scientific problem or the discovery of scientific principles, or both. Participants' reactions to this shift or orientation can be divided into several rough categories:

1. Some participants are willing to work hard, but only for something that promises *immediate gain*. This type of person tends to deplore the academic and theoretical aspects of learning.

2. Participants with superficial verbal precosity and pleasant manner, those who have breezed through years of schooling without incident and without real thought, are the least ready or equipped for learning.

3. The most worrisome of all participants are those who seldom raise their voices and never raise an issue. They are passive to learning, and have never been encouraged to question, to wonder, to ask "Why?"

4. Some participants, however, display critical enthusiasm. These are the ones who admire important ideas and challenging problems.

Investigators' reactions.—Now, with even-handed justice, let us classify the types of investigators who are likely to assist in such a program.

1. Some investigators look upon the program as a testing ground for their own specialties. Only the participants who exhibit a definite interest in such an investigator's field command his attention.

2. Some investigators belong to the school that proclaims, "Lay it out cold, and let the nuances fall where they may."

3. Many investigators enthusiastically welcome the student, make him feel "a part of the team," and give generously of their time for guidance, discussion, and stimulation of the student's interest and abilities. Often such investigators find the students interesting and stimulating.

SUGGESTIONS FOR A PROGRAM

If we are to assume the responsibility to fulfill the obligations of our profession, we must share the responsibility to acquaint the various participants with the facts of professional life. We should like to suggest a few principles for a suitable program.

We might well start the program by giving the participant a substantial and relatively comprehensive assignment. The important task is to convey the fact that we are serious about the purpose of our program, and the initial assignment may help to establish this point.

If the participants are actually to gain motivation or perspective in the intellectual skills of various scientific disciplines, presentation of assignments cannot move at breakneck speed through a mass of materials which are so numerous that they necessarily receive superficial treatment. The participant must have time to obtain reasonable control over a limited body of relatively complex material. Investigators would be wise to assign projects that can be treated with sufficient specificity and depth so that participants may be expected to understand the nature of their work.

We should willingly allocate whatever resources of energy and imagination we can command for encouraging the participant to identify himself with the purpose of the program. Indeed, regular and continuous communication between investigator and participant is essential for the development of the latter's understanding of the task before him.

Another way in which intellectual orientation to the objectives of such a research program can be improved is to stimulate the student by removing him from ordinary routine and giving him some kind of special attention. This can be achieved by having students meet frequently to discuss their projects and reactions to the program in general.

Careful selection of investigators is nec-

essary. Needless to say, any program is strengthened by very wide staff participation. This should not be mere token participation. Staff must be willing to devote time and thought to discovering ways to communicate with participants in order to convey the objectives of its program.

Evaluation of a program.—One crude measure of the effectiveness of a summer research program is the fact that the majority of our participants have felt sufficiently involved in their experiences that they keep on talking about them, and 50 per cent feel a strong desire to continue with their projects during the school year. Approximately 20 per cent of the participants in the summer program at the Roswell Park Memorial Institute have had no opportunity to return, but have carried on correspondence with their investigators throughout the year.

TABLE 2

EVALUATION OF SUMMER PROGRAM AT ROSWELL PARK MEMORIAL INSTITUTE BY SUMMER FELLOW PARTICIPANTS

	Excellent	Good	Fair	Poor
	(per cent)			
Laboratory and Research Supervision	93	7		
Laboratory equipment and facilities	82.5	7	7	3.5
Opportunity for contact with staff	55.1	37.9	7	
Opportunity for individual research	68.9	27.6	3.5	
Opportunity for self-development	93	3.5	3.5	
Aid to career planning	48	37.9	14	

Another measure of the effectiveness of this program is the fact that 20 per cent of our participants have received scholarships and other awards as a result of their work at Roswell Park, and 2.5 per cent have published papers reporting their work, in professional journals. It is too early to say definitely what percentage of our summer participants have found their work at the Institute responsible for determining their vocation. However, there are already significant indications of such experience being an aid to their career plannings (Table 2). Follow-up studies are expected to substantiate this impression.

Some samples of the comments in our follow-up studies are indicated below:

"The greatest benefit I received was orientation in my chosen career, chemistry."

"I evaluate the experience as one of the most important experiences of my learning career."

"It decisively has shown me how the different sciences are applied and the positions that are available in different sciences."

"The experience has broadened my interest and has stimulated my thinking."

"It has succeeded in interesting me in fields in which I would have thought I would not be interested."

SUMMARY

Details of a summer research participation program at Roswell Park Memorial Institute in Buffalo and Springville, New York, for talented high school, college, medical, dental, and graduate students and for high school teachers are described. Reactions to the program by participants and staff are briefly stated, ample use of wide staff participation is noted, and effectiveness of such a summer research program is indicated.

Psychiatry–Inherited or Acquired Knowledge*

EDWARD A. TYLER, M.D.†
Department of Psychiatry, Indiana University Medical Center Indianapolis, Indiana

Most knowledge is presumed to have been learned, i.e., acquired by repeated exposure, first to its simple and later to its more complex concepts. Upon examining the stated premedical educational requirements and basic medical science curricula, however, one could draw the conclusion that many medical educators consider the knowledge of psychiatry (and human social behavior) to be a constitutional or inherited characteristic of physicians, i.e., applied "common sense."

From examination of (*a*) catalogue course descriptions, (*b*) more detailed departmental descriptions, and (*c*) discussions by clinical psychiatrists, one must conclude that an understanding of "normal human behavior" is felt to be a prerequisite for proficiency in recognizing and treating emotional disorders but that there is very little agreement about what the science of human behavior embraces. In its broadest concept human behavior concerns itself with histophysiology, organ and system biochemistry and physiology, as well as psychological and social behavioral phenomena in an environment with implicit and explicit limits. More specifically the clinical psychiatrist has focused his attention on the recognizable malfunctioning of man's social performance. In his effort to develop methods of influencing man's disturbed social behavior, the psychiatrist has tried to understand its significance, its motivation, and the external environment in which it occurs. His observations and conclusions involve many levels of abstraction not easily compared or translated.

* Presented at the Annual Meeting of the Association of American Medical Colleges, Chicago, Ill., 1959.

† Associate Professor.

In the medical faculty the psychiatrist frequently finds himself as the advocator of the concept that the physician must know, examine, and treat the "whole man." This is unfortunate, since most psychiatrists, through their special interest and training, have become "experts" concerning only a segment of the whole man just as their colleagues in other specialities. Much of the psychiatrists' criticism of medical education is concerned with what he recognizes as neglect of this segment and its correlation to the rest of medicine. Having had the same required background in chemistry, physiology, etc., as his fellow physicians, he "discovers" that he also needs some basic knowledge of social science to comprehend his clinical field. Since all fields of medicine overlap, most physicians must, at least, deal with their patient's social and psychological responses to a physical illness. Here, a social science background is extremely valuable if not essential.

In evaluating the future physician's background studies, the author will limit himself to that segment of human behavior which is most conspicuously deficient in the medical and premedical curriculum: This is man's psychological and sociological behavior. To examine the current trends and attitudes the author will present several charts based on data collected from medical college catalogues, students' premedical records, and a poll of practicing physicians.

Table 1 examines the premedical educational requirements as set forth in the catalogues being mailed during the first half of 1959. Social science requirements are shown as required, recommended, or not mentioned

in a narrow sense (anthropology, psychology, and sociology) and in a broad sense (humanities). This is contrasted with the required and recommended modern foreign language requirements and the statements concerning the value of an undergraduate degree.

From the catalogues the college freshman or his faculty advisor would not be likely to conclude that a basic knowledge of the social sciences is essential to the study or practice of medicine. On the other hand, he might well believe that "he must have a good reading knowledge of a modern foreign language" (4). It seems doubtful that admissions committees really believe that a significant number of their graduates read journals printed in a foreign language, desirable as that may be. Most of their graduates are busy practitioners who probably find it difficult to read even the appropriate journals and abstracts that are printed in English.

It is sometimes pointed out that, since most medical schools require an undergraduate degree for admission, the needed social science background will have been obtained even though it wasn't specifically listed as required. However, examination of the bulletins reveals that three-quarters of all U.S. medical colleges do not recommend an undergraduate degree prior to entrance.

The fine print in the admissions sections of some bulletins may influence the prospective student by advice, such as:

"Courses in social sciences and the humanities are as important to a prospective medical student as further courses in science" (9). "The impact of disease on the family and the planning-for optimum adjustment of the patient in the community requires the physician to have a broad cultural background. Knowledge of social and behavioral factors as well as technical training in professional skills are necessary" (10). "It is exceedingly important that specialists in the health sciences remain fully aware that they are dealing with human beings and not scientific data alone" (12). One of the four major objectives should be, "a foundation for an ever-increasing insight into human behavior, thought and aspiration through study of individual man and his society, as revealed by both the social sciences and the humanities" (1); "Unless that foundation is laid early, there is always the danger that later demands of technical and professional training may lead to its neglect" (7).

TABLE 1

PREMEDICAL EDUCATIONAL REQUIREMENTS

SOCIAL SCIENCE					
Anthropology, Psychology, or Sociology		Humanities courses		Neither mentioned	Total schools studied
Required	Recommended	Required	Recommended		
6	4	5	36	33	84
MODERN FOREIGN LANGUAGE					
27	18				84
UNDERGRADUATE DEGREE					
		3 years		2 years	
6	13	64		1	84

Influenced by these or their own concepts of "what is a physician," premedical students seem to feel more need for a social science background than do the admissions committees. In one medical school, whose bulletin mentions nothing about social science or humanities, college records of all medical students were examined and tabulated. Most students elected to take one or more courses in anthropology, psychology, or sociology, but 14 per cent did not. The wide variation suggests that the students and their college faculty advisors tend to feel social science is important, but are con-

fused about how it will influence the admissions committees.

Some faculty members comment that students who take college social science courses are looking for easy courses instead of taking more physical science courses. If so, one would expect this to be reflected in their over-all medical school performance. When one compares the upper ten, twenty, or third with the lower ten, twenty, or third, there is no evidence of this.

Among the premedical students electing not to take social science courses are some probably influenced by fine print statements from bulletins not mentioning social science or the humanities:

TABLE 2

PREMEDICAL COURSES TAKEN BY ALL STUDENTS OF A MEDICAL COLLEGE WITH NO SOCIAL SCIENCE OR HUMANITIES RECOMMENDATIONS

	No. Students Taking Anthropology, Psychology, Sociology				
Class Year	All Three	Two	One	None	Totals
1st	6	56	70	27	159
2d	10	50	70	17	147
3d	2	45	73	21	141
4th	12	67	47	13	139
Total	30	218	260	78	586
Per cent	5	37	44	14	100

"Courses in the sciences beyond those required do not necessarily improve the applicant's prospects of admission, but a strengthened foundation may be gained through the following suggested choices: elementary physical chemistry, comparative vertebrate anatomy, embryology, and genetics" (11). "Beyond these minimum science requirements, Comparative Anatomy and fifth semester of Chemistry are recommended" (6). "In view of the increasing employment of mathematical concepts in the medical sciences, students expecting to take up the study of medicine are advised to include one year of mathematics, calculus if possible, in their college course" (8), and "The basic pre-medical requirements which all students must fulfill to qualify for admission to the study of medicine in New York State are set forth in the 'Regulations of the Commissioner of Education,' In conformity with these regulations" . . . (this school) "requires for admission the satisfactory completion of at least six semester hours in each of the following subjects: English, Physics, Biology or Zoology, General Chemistry and Organic Chemistry" (5).

It must be remembered that the premedical student and his faculty advisor feel obligated to select the electives which they feel are most likely to favorably impress the medical college admissions committee. Some medical educators object to adding any more required courses for fear of harming the broad liberal education of the future physician. However, they do not seem willing to recommend removal of all courses from a required list and substituting a list of recommended courses, supplemented by a detailed fine-print description of the broad liberal education they feel best prepares a man to study medicine. One suggested that a course in Shakespeare might be as valuable a prerequisite as a social science course.

TABLE 3

PREMEDICAL SOCIAL SCIENCE CREDITS/ MEDICAL COLLEGE PERFORMANCE

Class Standing	Social Science Credits			
	0	1–6	7–12	13–52
Upper 10	6	15	10	9
Lower 10	2	22	9	7
Upper 20	10	36	23	11
Lower 20	8	40	22	10
Upper ½	27	79	55	24
Lower ½	21	89	54	21

Numbers represent totals for all four classes in one school.

Since one bulletin "advises the applicant for admission that it will not be to his advantage to pursue courses in his collegiate career that will be duplicated later in the medical curriculum" and that "Such a selection of courses serves only to waste time that cannot be later recaptured" (3), one might expect to find the courses necessary for the understanding of clinical psychiatry included in the basic science curriculum of the medical colleges. Examination of the basic science curriculum of 81 medical colleges does not bear out this supposition.

Table 4 shows the clock hours devoted to each basic science course as well as a total of all scheduled hours during the first year. These data were obtained from current catalogues clarified by letters from the deans' offices when necessary.

Even though many medical students have no college background for understanding clinical psychiatry, the median basic science clock hours allotted to psychiatry are less than 4 per cent of the total. Eleven medical colleges allot less than 2 per cent. In clock hours the highest number allotted to psychiatry is less than the median for 5 of the other six basic sciences, and the median for psychiatry is lower than the lowest number assignment to any other basic science. The data presented so far suggest that medical educators are willing to offer clinical courses in psychiatry with little basic science background. This is an attitude no longer acceptable for other clinical courses.

TABLE 4

BASIC MEDICAL SCIENCE CLOCK HOURS

SUBJECT	CLOCK HOURS Median	CLOCK HOURS Range	NO. MEDICAL COLLEGES INCLUDED
Anatomy	591	419– 777	81
Biochemistry	238	168– 341	81
Physiology	256	154– 438	81
Microbiology	211	110– 300	81
Pathology	312	198– 479	81
Pharmacology	174	96– 375	81
Psychiatry (human behavior)	64	16– 208	81
Total scheduled in one year	1160	900–1366	81

There appears to be so little agreement about the clock hours needed to teach any given basic science, or how many total hours a student can handle, that it might be suspected that the allottment of curriculum hours frequently depends more on the demands from individuals or departments than any coordinated long-range planning by curriculum committees. A better system might be developed by evaluating what ultimately proves to be most valuable to a majority of the graduates of a particular medical college. The special needs of other students could be met by a wide choice of electives.

Because a curriculum committee might reasonably ask, do graduate physicians have any need for psychiatry courses in their curriculum, 1000 practicing graduates (1946–1955) from one school were polled with the card below (Table 5). The wide distribution of this sample is indicated by 245 of 594 answers being from 37 states other than Indiana, the location of the school whose graduates were polled. (Ranked in order of frequency, the highest were California, Florida, Michigan, Illinois, Ohio, New York and Texas.)

Chart 1 shows the distribution of 594 answers according to the frequency with which the different groups of practicing physicians recognize emotional or psychiatric problems in their own practices. (Radiology, pathology, laboratory, public health, industrial medicine and unspecified were included under others.) More than 80 per cent recognized that they were seeing a sizable number of patients with emotional problems.

Chart 2 shows the percentage in each group who feel that they use psychology or psychiatric techniques in the management of this recognized group of emotionally disturbed patients. This is further broken down into the occasional and frequent use of these techniques.

This small but significant sample shows the high percentage of physicians who are using clinical techniques, the basis for which they have little understanding. Chart 3 shows that, although their patient load demands this, these physicians do not feel that their medical school training was very valuable in helping them understand how to manage these patients.

There is some validity in the attitude that clinical psychiatry is not yet ready for a basic science. If curriculum committees assigned an "adequate" (whatever that may be) number of hours to the basic science of human behavior, there is little agreement as to how it should be used. The author feels this will continue until medical school faculties have had a chance to gain experience in

TABLE 5

POLLING CARD

Dear I. U. Medical Alumnus:

We are studying certain aspects of the medical students' curriculum. We are asking the I.U. graduates, 1946 through 1955, to help us by answering the four questions on the attached postal card. Only a check in the appropriate box is necessary.

Thank you very much for your help.

Sincerely yours,

Edward A. Tyler, M.D.
Associate Professor

1. Your field of medicine is: General Practice ☐ Surgery ☐ Dermatology ☐ Pediatrics ☐ Radiology ☐ OB Gyn ☐ Psychiatry ☐ Laboratory ☐ Internal Medicine ☐ Other ☐
2. 0 ☐ 10 ☐ 20 ☐ 30 ☐ 40 ☐ 50 ☐ 60 ☐ 70 ☐ 80 ☐ 90 ☐ 100 ☐ percent of your patients have psychiatric (emotional) disorders as their primary diagnosis or complicating problems.
3. Do you feel that you use psychology or any psychiatric techniques in the management of the above patients.
   Never ☐ Occasionally ☐ Frequently ☐
4. Do you feel you learned very little ☐ a great deal ☐ nothing ☐ about these methods of patient management while you were a medical student.

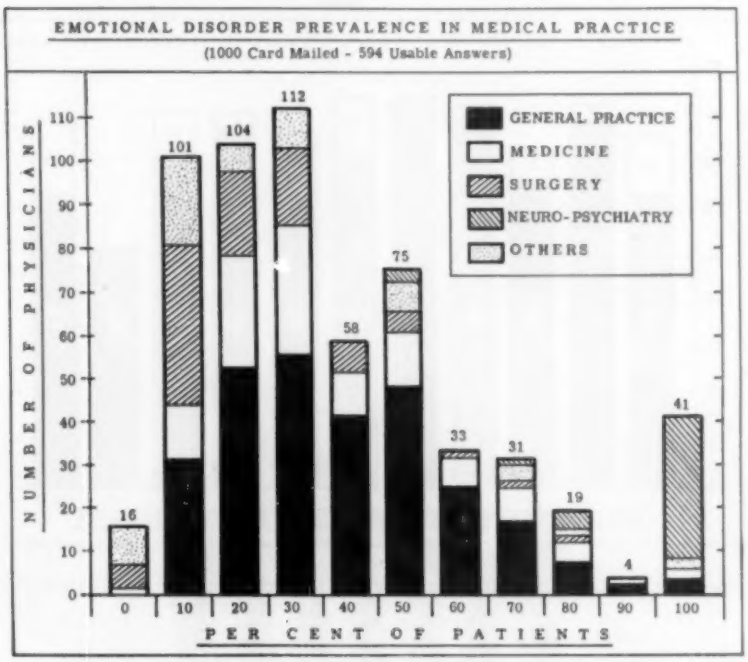


CHART 1.—Practicing physicians' contact with psychiatric problems

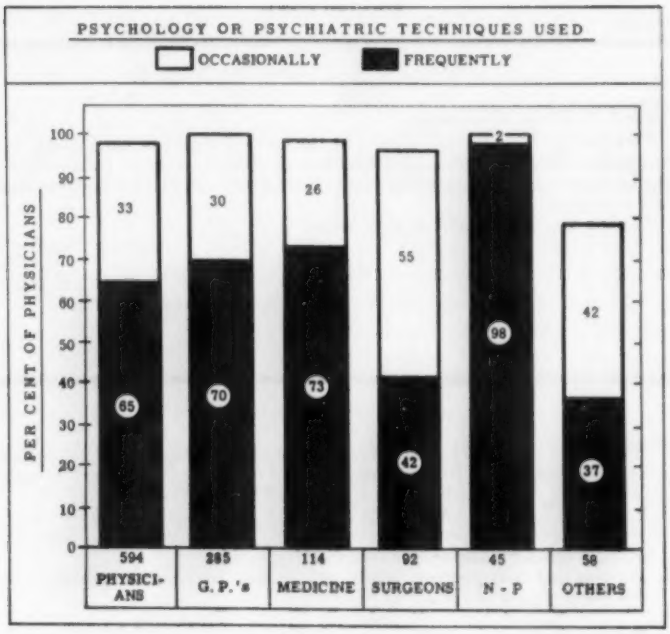


CHART 2.—Practicing physicians' management of psychiatric problems

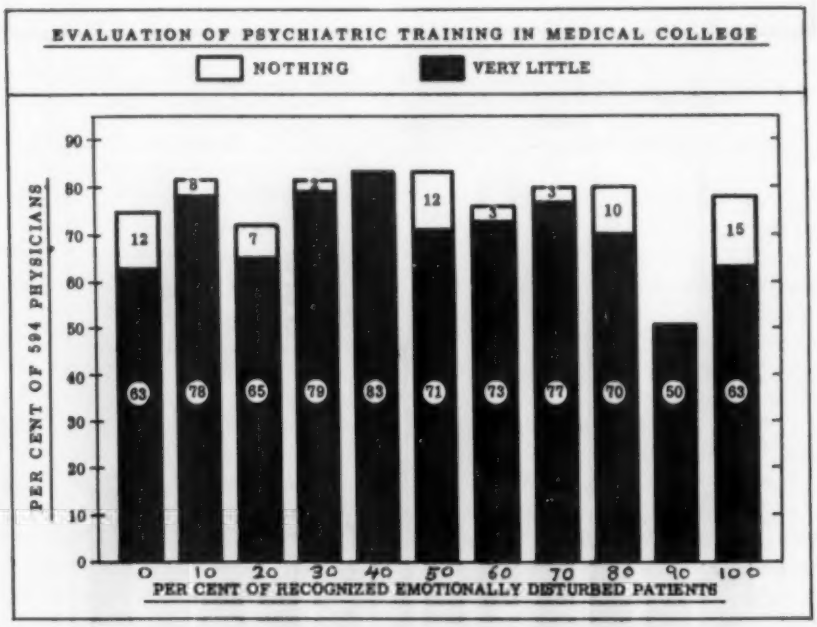


CHART 3.—Practicing physicians' attitude toward their psychiatric education in medical school

research and teaching of the psychological and sociological aspects of human behavior.

Although psychiatry has become a recognized and acceptable part of the medical curriculum in recent years, this has primarily been in the clinical field. Most students are ill-prepared to understand these clinical psychiatric courses because of their limited understanding of the role of the social sciences in human behavior. The author further believes that medical educators (curriculum committees and psychiatry faculties especially) have great need to critically reexamine their premedical educational requirements and their undergraduate psychiatric curricula. Medicine urgently needs the development of a basic *science* with the relationship to clinical psychiatry that biochemistry and physiology have to internal medicine, or anatomy has to surgery. Such a science will then need the assignment of sufficient clock hours to be adequately taught, and the premedical education must provide the necessary prerequisites for its understanding.

REFERENCES

1. Announcement of the School of Medicine Univ. of Cal., p. 44. Los Angeles, 1958–59.
2. Bulletins (most recent available in 1959), 84 U.S.A. Medical Colleges.
3. Bulletin of University of Kansas, Vol. 59, No. 6, p. 8.
4. Bulletin University of California, Vol. 52A, No. 11, p. 13.
5. Cornell University Announcements, Vol. 50, No. 5, p. 41.
6. Marquette University Bulletin, Vol. XXXVI, No. 10, p. 33.
7. Publication of Washington University, Series II, Vol. LVI, No. XIV, p. 20.
8. The Johns Hopkins University Circular, School of Medicine, No. 663, p. 81.
9. The University of Buffalo, Vol. XLV, No. 17, p. 69.
10. The University Record of the University of Florida, Vol. LIII, Series L, No. 2.
11. Tulane University Bulletin, Series 59, No. 9, p. 26.
12. University of Oregon Bulletin, No. 72, p. 18.

A Psychodynamic Study of Medical Students and Their Adaptational Problems

Preliminary Report*

HAROLD I. LIEF, M.D., KATHLEEN YOUNG, PH.D., VANN SPRUIELL, M.D., ROBERT LANCASTER, M.D., AND VICTOR F. LIEF, M.D.

Department of Psychiatry and Neurology, Tulane University School of Medicine
New Orleans, Louisiana

The central problem in medical education in this century has been stated very well by Sir Henry Dale, "How to ensure that the student shall continue to acquire a sufficiently competent grasp of what is really essential, out of the mounting superabundance of what is known, and at the same time to sharpen rather than satiate his appetite for the further development of knowledge, and to stimulate rather than to quench any spark of imagination, any faculty of mental enterprise, with which nature may have endowed him" (1).

At a time when general scientific information is estimated to double every 10 years (and medical information is probably no exception), educators, justifiably, are concerned about how to solve this very perplexing problem. Large-scale experiments in medical education are going on in a number of schools. There is a ferment, a kind of excitement which pervades this area of education, as we sense that we are living through a period of change in which some or many of our traditional ways of doing things, as well as our values and attitudes, are changing.

The product, the medical student, is the object of our investigation. We are trying to answer a few primary questions. (*a*) What kind of product are we turning out? (*b*) What are the "manufacturing processes" by which the finished product comes off the assembly line? Since the processes do not constitute passive procedures but are really transactions between the student and the school, (*c*) What are the special problems and stresses encountered by the student, and, (*d*) How does he meet them? Finally, (*e*) What are the relations between his personality and the types of coping mechanisms used?

* Aided by a grant from the Commonwealth Fund.

Delivered before the Seventh Annual Meeting of the American Association of Medical Colleges, November 3, 1959.

METHOD

A. POPULATION CHARACTERISTICS

We are dealing with three groups: a non-patient, academically stratified but otherwise randomly selected group; a group selected on the basis of class standing at the end of the freshman year (the upper and lower ten); and a patient group. The first two groups have been seen personally by us for interviews and psychological tests. We have not routinely interviewed either the patients or the therapists, but a number of clinical conferences dealing with students as patients have been held, and the therapists have cooperated very well in answering a special questionnaire concerning their student patients.

Table 1 contains information on the number of non-patient students being studied as well as the projected number to be seen.

Table 2 gives the same information for the upper and lower ten group, and Table 3 describes our patient population.

Patient group.—If one refers to Table 1 it can be seen that our N will be 60. Of the 60, six graduated last June. They constitute one of the two groups of students to be discussed in this paper. Eight students have dropped out of the project. Two of these eight dropped out of school altogether, while the remaining six have gone into treatment and are part of the patient population. Parenthetically, the two who dropped out of school left because of emotional disturbances.

As one can see from the table, we have started with six freshmen and added twelve to that group in the sophomore year, making a total of eighteen for each of three years. In addition, we had a pilot group of six referred to above as the group under discussion in this paper. A word about the process of selection. Other than the fact that we select an equal number from the upper, middle, and lower third, the names are selected at random from the lists of students. Volunteers, and there have been many, have been turned down, since many studies have now indicated that volunteers do not make up a representative sample of a given population.

There are ten psychiatric interviews per year, although in some cases there have been more and in some a few less. The frequency has varied. Sometimes the interviews have been spread out over the school year; other times they have been bunched. There have been no drop-outs. We have received 100 per cent cooperation as far as participation is concerned, although resistance has varied considerably among the individual participants.

Upper-lower ten group.—We have interviewed the upper ten and the lower ten stu-

TABLE 1

THE NONPATIENT POPULATION

Time Academic year	Senior	Junior	Sophomore	Freshman	Total
Jan. 1, 1957–Sept. 1, 1957	0	0	6	0	6
1957–1958	0	6	18	6	30
1958–1959	6	18	18	6	48
Expected 1959–60	18	18	18	0	54
Expected 1960–61	18	18	0	0	36
Expected 1961–62	18	0	0	0	18
	60	60	60	12	

TABLE 2

UPPER-LOWER TEN POPULATION

Time Academic year	Senior	Junior	Sophomore	Freshman	Total
1957–1958	0	0	20	0	20
1958–1959	0	20	20	0	40
Expected 1959–60	20	20	0	0	40
Expected 1960–61	20	0	0	0	20
Total	40	40	40	0	

TABLE 3

THE PATIENT POPULATION

Total number of patient students (including current patients)	107
Number of current patients	12
Estimated number to end of 3-year period	120
Estimated number to end of 6-year period	180
Average number of sessions	71

dents in each of two classes. We have begun this in the sophomore year after we have the ratings for the freshman year. These students are interviewed twice a year during their sophomore, junior, and senior years, and receive a battery of psychological tests. In addition to the general problem of the relationship between personality and success, we are interested in changes that take place throughout the 4 years of medical school. Why does a failing student rise to become 23d in his senior class, as happened to one student several years ago? Why do some at the top of the class as sophomores fall to the lower third in their senior year? The plan is to study these changes statistically as well, so that the "mobility deviants" can be singled out for special attention.

Patient population.—These students have been treated intensively. The data presented in Table 3 on the average number of sessions is an indication of the "depth" of analysis possible. With the use of the five-session figure commonly employed by out-patient clinics to determine the number of "dropouts," less than 5 per cent have dropped out as compared with the usual 45 per cent. Because the psychiatric facilities are so readily available to our students, we feel that many of these students who become patients are showing signs of fairly healthy ego strength in seeking help. The psychiatric clinic is recognized as being apart from any administrative jurisdiction, and becoming a patient does not reflect in any way upon the student's academic career.

B. DATA COLLECTING

We have used two direct methods of data collecting—the interviews and the psychological tests. Of the indirect methods, we are using a special questionnaire to obtain data about our patient population, and we have been working on a series of rating scales to be applied to our nonpatient groups.

The interviews.—Generally, the interviews have been nonstructured, but not as completely as psychotherapeutic interviews. The interviewers have been more active and tend to introduce salient points if the discussion lags. The kinds of material elicited range from specific attitudes toward certain courses in school to considerable discussion of the student's early background and history. It is a continuing problem to maintain a balance in the interviews between obtaining information about current medical school activities and information which will enable the interviewer to evaluate the total personality of the student without turning the interviews into psychotherapeutic sessions.

Psychological tests.—To give a broad picture of the individual student and the group as a whole, three tests are administered, designed to give information in the areas of intellectual functioning, general personality evaluation, and occupational interests. We hope that the psychological data will not only provide a descriptive picture of the group, but also aid in formulating concepts which might be helpful in organizing the data. It will be used as well by comparing it with the data gained from our other direct method, the interview. The tests are the Miller Analogies Test, the Rorschach Test, and the Strong Vocational Interest Blank, including the Medical Specialists Preference Blank. The MAT and the Strong have been given in a group setting; the Rorschach has been administered individually to the two nonpatient groups. On our patient group we have Rorschach data, and in some cases the MAT has also been done. Most of the testing is done in the sophomore year, and we have tentative plans to repeat the battery on selected students toward the end of the senior year.

Questionnaire on student patients.—We are using a special questionnaire filled out by the therapists of the student patients.

Rating scales.—We are in the process of working out a series of rating scales. The scales are of the five-point graphic rating scale type, allowing for ratings to be made at any point along the continuum. Such ratings can be quantified. The ratings will be made by each of the psychiatric interviewers

on the basis of their interviews with a given student.

The scales are an outgrowth of our interest in ego strength. As we compared our nonpatient population with our patient group, we could discern clinically and through our tests a great deal of "psychopathology" in our nonpatient group. Their better adaptation, then, was due to factors in their personalities which could not be either easily identified or measured. The nature of the project itself and the fairly lengthy period of observation of nonpatients made a study of the "healthy ego" imperative, and ways of studying this became one of our major areas of concern. To accomplish this task it is necessary for us to rid ourselves of, or at least reduce, the ingrained professional bias of thinking in psychopathological terms, or we would end in making the trite observation that all people have some personality distortions. Such a study involves many difficulties, not the least of which concerns language.[1]

As examples of the need to develop new concepts and a new language describing strengths as well as psychopathology, we can cite two instances. One student could function in a seemingly quite mature and independent fashion, provided he were involved in a definitely structured situation. It seems that for him the high degree of organization of the medical school provided him an almost perfect milieu. Taken out of such a structured situation, very marked pathological trends appeared. In another subject we found a man who was a leader scholastically and socially among his classmates. He was regarded almost universally as the "ideal" medical student, calm, studious, responsible, yet study revealed his behavior to be a very necessary screen or façade, which seemed to be almost impenetrable. Very few students knew this individual, whose inner life was anything but tranquil.

[1] "The Freudian vocabulary is rich in terms to describe what the sociologist calls 'deviance,' but it is neither rich nor systematic in the vocabulary it offers for the description of the range of normal behavior, traits and types" (2).

Using our interview material as a background, we have put down in the form of a series of rating scales the many factors which we judge to be important in assessing the individual, as a medical student and as a total functioning personality. We also are rating each subject on a predictive scale, predicting his future performance as a physician and as a total person. We are doing a follow-up of one-third of our students during their internship year. Additionally, a decade or two from now, another follow-up study could be done and a comparison made with the predictions. These rating scales provide one way of quantifying the qualitative interview material while stressing the insights and nonverbal evaluations which are the essence of the observations made by our trained interviewers. It is our hope that this technique may allow us, also, to identify subgroups of students, which in turn will shed more light on the problem of those factors which enhance the adaptational process.

TABLE 4

CHARACTERISTICS OF THE TWO GROUPS

	Patients	Nonpatients (subjects)
Men	6	5
Women	0	1
Age at graduation		
a) average	25	26
b) range	23–30	24–34
Married at graduation	2	5
Professional background of fathers	1	5

RESULTS

In describing our results in this preliminary report, we are concentrating on the first of the five questions described in the introduction, i.e., What kind of product are we turning out?

In order to indicate in this paper the ways in which we are analyzing our data, we are describing and comparing two groups of students, six patients and six nonpatients, all of whom graduated in June, 1959.

Some of the "vital statistics" of the two groups can be seen in Table 4. Two variables

where differences arise are the number married at graduation and the number of professional fathers of students. Since in this report we are dealing with the pilot aspects of our study, and hence with small numbers, we can say nothing about the statistical significance of any of our results. In this connection, or in others to be reported, the differences may be suggestive and have a certain heuristic value, and that is all.

The six non-patients were first studied in their sophomore year and were followed during their junior and senior years by the techniques outlined under method. Treatment data of the six patients are summarized in Table 5.

The patient group.—A striking finding in the patient group is that five of the six have obsessive-compulsive personalities. In keeping with this, we find that the chief problem of the five dealt with competition. They were intensely competitive and had strong fears concerning the question of "How competitive dare I be?" They were afraid of retaliation, and four of the five inhibited their competitive needs because of guilty fear, while one was overly aggressive because of the dominance of anger. Their chief complaints and primary symptoms were related psychodynamically to the central and over-riding conflict.

All these students had good academic records (Table 6). Although the two lowest were 106 and 109 in a class of 125 as freshmen, they were, respectively, 71 and 43 in their senior years. Three of them were excellent students, two of them making Alpha Omega Alpha. In these top students their obsessive-compulsive personalities and their strong perfectionistic strivings were strong motivating forces in the great effort made to obtain good grades. This was done at a

TABLE 5

TREATMENT DATA ON PATIENTS

Patient	Time of entering therapy	Length of treatment (months)	No. sessions	Chief complaint	Primary symptoms	Character diagnosis
1	Freshman	36	314	"Day-dreaming"	Excess competitiveness	Obsessive-compulsive
2	Junior	12	56	"Can't speak in front of group"	Phobia	Obsessive-compulsive
3	Sophomore	4	11	"I think I have a lymphoma"	Anxiety attacks	Passive-dependent
4	Sophomore	15	80	"Feelings of inadequacy"	Micropsia	Obsessive-compulsive
5	Freshman	20	94	"Persistent stiffness in neck"	Wry neck	Obsessive-compulsive
6	Junior	9	50	"I can't look at people"	Inhibition of self-assertion	Obsessive-compulsive, paranoid

TABLE 6

ACADEMIC PERFORMANCE OF PATIENTS

	ACADEMIC RANKING		AVERAGE MCAT	OVER-ALL UNDERGRADUATE AVERAGE
	Freshman-Senior (125 students)	Sophomore-Junior (125 students)		
1	14–15	23–21	502	2.70
2	11–16	9–13	542	1.69
3	65–85	103–69	537	2.19
4	106–71	83–46	480	1.93
5	5–52	11–53	605	2.53
6	109–43	92–27	412	1.78

price, that of never feeling adequate, despite superior performances. In the other two, obsessive-compulsive traits and symptoms actually interfered with their work through the usual errors of poor organization, inability to select the main points from the mass of detail, procrastination, etc.

Treatment was definitely of help to all six student patients. All who had structured symptoms (wry neck, phobia about speaking before groups, inability to look people in the eye) lost them or retained them to a minimal extent. They improved in their ways of dealing with people, becoming more appropriately assertive, succeeding in establishing heterosexual and warm, affectionate relations with others, etc. There is a correlation between the period of school in which they were treated and their grades, although this does not prove any causal relationship. One top student whose grades fell off was less competitive and perfectionistic as a result of treatment. This affected his grades adversely, but his whole outlook on life improved. His increased sexual activity may have taken time away from his studies, but his over-all future is brighter.

Rorschach tests on this group demonstrate definite psychopathology in all. It also verifies the clinical impression of obsessive-compulsive personalities; five of the six who were thought to belong to this group showed definite over-control of their emotions, while the hysterical passive-dependent personality demonstrated under-control of his emotions. There was a strong correlation between the clinical impressions and the psychological testing in regards to the comparative degree of illness demonstrated by these students, although the Rorschach indicated more serious psychopathology than was found clinically. In none of them was the diagnosis of schizophrenia entertained seriously by the psychiatrists, although in four of the six it was, on the basis of the Rorschach.

Nonpatient (subject) group.—This group is not as easy to characterize as the patient group. It is more diverse, less easily labeled. Two of the students are primarily obsessive-compulsive, rather inhibited people, who on the Rorschach showed the same type of over-control that the patients do. Two of them are expressive, demonstrative people who under-control their emotions, while two (the best students, by the way) show a better balance between their emotions and intellect.

Although these students demonstrate psychopathology too (albeit less seriously than do the patients), they do not seem to be as affected by their fears and conflicts. This seems to be related to the total organization of their personalities, including their strengths and the flexibility of their adaptive devices. A significant finding is the great ease these students have in dealing with others. Inwardly they have fears and conflicts, but outwardly they appear confident and competent. Another important finding is that half of the six are not particularly flexible people but do very well in a highly structured situation, such as medical school, and are probably heading for group practice. The same people tend to be conformist and "other-directed." They often produce in the faculty a high regard for them on the basis of their "easy fit" within the teaching situation. These people also tend to be the doers, the technicians, the practical, those who, as Alan Gregg put it, know the *connaître* but not the *savoir*.

There are some students who are more creative; they tend to be more flexible but are apt to be more rebellious and inner-directed. The other half of our students are in this category. When the two features of doer and thinker, practical person and idealist, technician and conceptualizer, *connaître* and *savoir* are found in proper balance, the ideal student has been found. One or two of our subjects come relatively close to achieving this balance. Even the ideal student, on close examination, is found to have important psychological problems, justifying a recommendation for psychotherapy. In our biased view, the ideal student is not the one necessarily free of inner turmoil or pain. The "best adapted" student may be, but he is not necessarily the creative one

from whom great, or at least significant, things can be expected.

Comparison of the patient and nonpatient groups.—Although the patient group was "sicker," they performed very creditably. In some ways they have more potential. They are much more introspective; they are not nearly as frightened of revealing themselves as were most of our subjects. They were strong enough to seek help when they needed it. Seeking psychiatric assistance definitely does not indicate an inferior student. Improvement as a result of treatment is also indicative of their real strength. Parenthetically, it is not the emotionally ill student who usually fails in school. In our school, at least, it is the emotionally ill student who refuses to recognize his need for help who fails.

Despite the psychopathology present in the nonpatient group, their strengths (lack of fear of competition, better organization of work habits, most of all their better ways of dealing with people, which is related to freedom from fear of authority) produce better adjustments.

A look at the combined group shows the overwhelming preponderance of the obsessive-compulsive personality type, the meticulous, orderly, highly organized person who is responding primarily to the dictates of his conscience rather than to the demands of his passions. This is obviously overdone in the patient group, with consequent behavior difficulties and inner turmoil.

Personality and grades.—Tables 6 and 7 reveal that important changes in class standing occurred in nine out of twelve students, and, when they did, in six instances out of the nine, the change occurred between the second and the third years. The clinical years favor the doer, the technician, yet they also favor the student with better interpersonal relations. The attitude of the student that pays off the most is that of thoroughness and conscientiousness. In each of the six students whose academic rank changed perceptibly in the junior year these factors just enumerated were the significant ones (unless an important change in the life situation happens during this period).

There is a slightly negative correlation between academic success in the senior year and undergraduate averages and the MCAT as well. This zero or minus correlation is evidence for our empirical notion that personality factors are far more important than intellectual ability in determining the degree of academic success of the student.

TABLE 7

ACADEMIC PERFORMANCE OF NONPATIENTS (SUBJECTS)

	Academic ranking			
	Freshman-Senior (125 students)	Sophomore-Junior (125 students)	Average MCAT	Over-all undergraduate average
1	2–1	1–2	532	2.15
2	1–31	7–7	515	2.92
3	60–30	81–28	345	1.48
4	40–4	43–6	455	1.84
5	81–44	55–55	502	2.50
6	100–34	115–116	510	1.63

DISCUSSION AND SUMMARY

In view of the fact that this is a preliminary report on the pilot aspect of our study, all our conclusions must be deemed tentative. Nevertheless, we feel that certain trends are manifesting themselves.

In this report we have selected for discussion only a few of the many variables we have been examining. Many of the factors that are particularly unique for a medical school environment have been left out altogether. Such factors as the assumption of

responsibility for the health and the life and death of the patient, the doctor-patient relationship, the self-image of the student as he develops from a lay person to a physician, factors promoting "uncertainty" (Renee Fox), the impact of the need to learn many technical procedures, etc., are all left out. If one were simply to list items under "initial experiences," one would find an imposing number. Initial experience with cadaver; death of patient; chronic or hopeless disease; physical examination, same sex, opposite sex; gynecological or rectal examination, same sex, opposite sex; with autopsy; with lumbar punctures; with venipuncture; with venereal patients; with deliveries; etc. We are certain that even this list is far from exhaustive. It is obvious that a full discussion of all the factors that we are considering in our research could not be encompassed in a single paper. We have left out entirely any discussion of the upper and lower ten group.

In this paper, then, we are addressing ourselves for the most part to the first of the primary questions raised in the introduction, namely, what kind of product are we turning out? The personality factors that seem most important in determining the student's academic success and general adjustment in medical school are (*a*) total organization of personality, (*b*) flexibility, and (*c*) motivation for becoming successful.

Total organization involves such factors as are enumerated in our rating scale of "ego strength" (see Table 8). In general, this can be best determined by examination of the student's life performance in the past as well as in the present. Among other things, how well does the student meet frustrations and anxiety-provoking situations? Is he persevering? How (perhaps too much as well as not enough) does he control his impulses? etc.

Flexibility can best be determined by the number of roles the student has played in different milieus. How has he handled these different roles? (e.g., serviceman, counsellor, hospital orderly, salesman, various social as well as occupational roles). One important problem here is that of the rather rigid person who will fit into a medical structure because of his familiarity with it; in a sense he may have been adjusting to the medical environment from an early age, as is the case with a doctor's son.

TABLE 8

EGO STRENGTH RATING SCALE

Level and quality of fear/rage	An evaluation of the level and quality of the fear/rage response
Adequacy of defenses	An estimate of the adequacy of defenses, including their organization, protective function, pathology
Self-discipline	An estimate of the individual's perseverence, ability to postpone pleasure for later gratification, synthesize one's goals with one's abilities, ability to assign proper priority to one's tasks
Level of welfare emotions	The ability to feel and express love, hope, joy, pride, optimism, enthusiasm
Flexibility and adaptive behavior	The total executive or ego functioning of the individual
Integration between emotion and intellect	An estimate of the degree of balance between emotions and intellect
Perception of reality	The awareness of the reality of the external world and of the self
Self-esteem	The evaluation of and regard for one's own attainments and potentialities; pride, self-satisfaction; worthwhileness—the individual's conscious evaluation
Creative thinking	Conceptual ability; ability to bring in new solutions to problems; freedom from stereotyped, inflexible thinking
Identity	The end-product of the processes of identification; awareness of primary roles which are stable and continuous

Motivation for becoming successful is the third criterion. The word "successful" is stressed because analysis of the motivations for being a doctor is not too helpful. If the student wishes to be a success (no matter by what values he defines success), by dint of hard work and not by magic, he will probably turn out to be a successful student. It is the student who has a fear of becoming successful and so sabotages his efforts or the student who wants success magically (effortlessly and instantaneously) who gets into serious trouble. It is true that we find students at age 20 who are still genuinely confused about their occupational goals, but almost invariably they have marked conflicts about competition and success.

It may be worthwhile to repeat for the sake of emphasis that medical students rarely flunk out of school because of intellectual defects. Almost always it is on the basis of psychological and emotional problems which affect their thought processes, their organization of their work, and the learning process itself.

Since obsessive-compulsive characters tend to be most frequent, either this type of person seeks out medicine as a career, or else it is this type which we tend to select. This is not invariably bad, since these traits can be very helpful; they are not necessarily harmful.

Students with emotional problems do well in treatment (best age for treatment); potentially they are good doctors. It is the student who cannot or will not recognize his serious emotional problems who is most likely to get into difficulty.

Only a few of the factors we are investigating have been discussed in this paper. From our total study it is becoming increasingly clear at the midway point in our 6-year research program that certain patterns are emerging. We are hopeful that these patterns and common denominators will allow us eventually to draw conclusions that will be useful to medical educators in the selection of students and in the problem of changing the medical school environment so as to produce the best fit between the personalities of medical students and the types of learning experience to which they are exposed.

REFERENCES

1. DALE, SIR H. H. Foreword, p. viii. *In:* W. C. GIBSON, Young Endeavor. Springfield: Charles C Thomas, 1958.
2. INKELES, A. *In:* SIDNEY HOOK (ed.), Psychoanalysis, Scientific Method and Philosophy, p. 128. New York: New York University Press, 1959.

MEDICAL EDUCATION FORUM

Editorial

E.C.F.M.G.

As one of the founding fathers, the A.A.M.C. has a natural pride in the development of the Educational Council for Foreign Medical Graduates. The responsibility for conception and development has been shared with the American Medical Association, the American Hospital Association, and the Federation of State Medical Boards.

The E.C.F.M.G. has as its objective the identification of qualified graduates from foreign medical schools who seek further graduate training in the United States. The increasing number of such applicants, the inability of the A.M.A. and the A.A.M.C. to establish a reliable program for the accreditation of foreign medical schools, and our responsibility to offer a sound educational program for the foreign graduate all played a role in the formation of E.C.F.M.G. Furthermore, dissatisfaction both from hospital staffs and from foreign house officers gave further impetus to the development of the program.

Hospital staffs complained that some foreign graduates had such serious language barriers which were not detectable on an application blank that they were unable to perform necessary record routines. In a number of instances the medical education of some physicians was so inferior as to render them a real hazard to the patient.

Foreign graduates had legitimate complaints that in many programs they were used as slave labor rather than as a participant in an educational program.

The certification of qualifications by E.C.F.M.G. includes an evaluation of credentials, successful completion of an English test, and a score of at least 70–74 per cent on the American Medical Qualification Examination.

Through September, 1959, 5,982 applicants had completed the examination, and, of this number, 45 per cent scored 75 per cent or better. An indication of the scope of the problem is that over 7,000 applicants were registered to take the examination on March 16, 1960.

The largest number of applicants has come from the Far East, particularly the Philippines, followed by Latin America, Europe, and the Middle East in that order. Thus far, 500 different medical schools in 91 countries are represented among applicants.

The E.C.F.M.G. is making a real contribution to the dilemma concerning the foreign graduate, yet thorny questions remain. In a number of countries formal recognition of graduate training through a degree or some other certification is essential to advancement. The awarding of University degrees is not the answer. Here is an area where the American Boards might fill an important role. Qualified foreign applicants should be admitted to the examination as are U.S. citizens.

Furthermore, we cannot expect the E.C.F.M.G. to replace strict approval policies for internships and residencies. Somewhere along the line, American Medicine must confront

the fact that internships and residencies are educational experiences and not labor camps. Let us be certain that E.C.F.M.G. does not lower standards to satisfy pressures for more foreign interns and residents.

Among the many factors that contribute to understanding between countries, soundly developed educational exchange programs occupy a central role. We are glad that E.C.F.M.G. is doing its job so well. The American Boards should open their examinations to qualified foreign graduates. At the same time termination of inferior intern and residency programs must occur.

JOHN Z. BOWERS
Editor-in-Chief

Datagrams*

RESEARCH FELLOWSHIPS

The research fellowship held by the student during medical school constitutes one of the major curriculum opportunities through which the student can enrich his understanding of the scientific aspects of medicine at the same time that he receives funds to defray the costs of his medical education. Comparative data on the various dimensions of the research fellowship as experienced by the 1959 graduating class are summarized in the figures below, with particular reference to two groups of students with different financial standing.

The proportion of students who did and did not have research fellowships during medical school are indicated in Figure. 1.

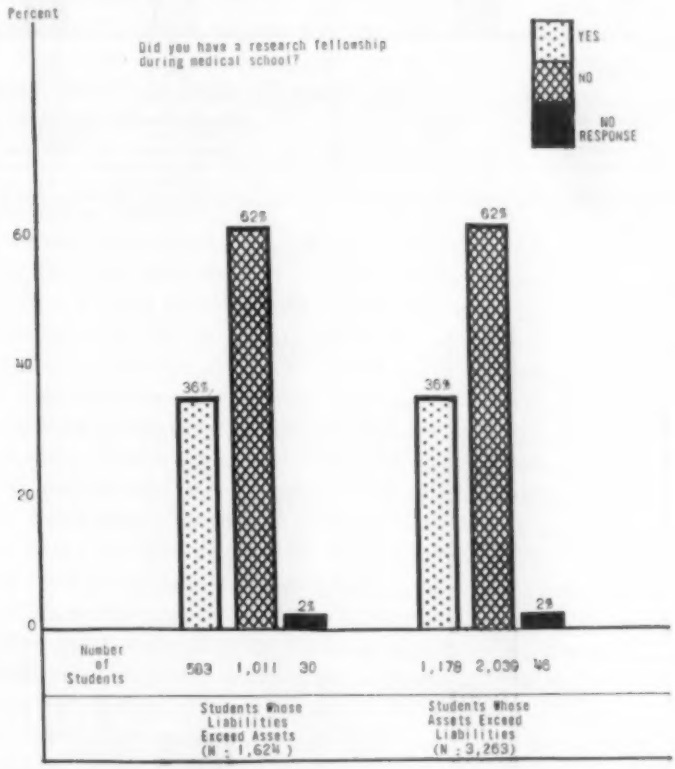


FIG. 1.—Percentage of students holding research fellowships during medical school

* Submitted by the Division of Operational Studies of the A.A.M.C. Source of information furnished on request.

The data concerning the duration in time of and amount of money earned from research fellowships by students holding such fellowships are summarized in Figure 2.

One of the important considerations involved in the research fellowship is a determination of the relationship between the total cost to the student of medical school and the amount of the research fellowship stipend. These data are summarized in Figure 3.

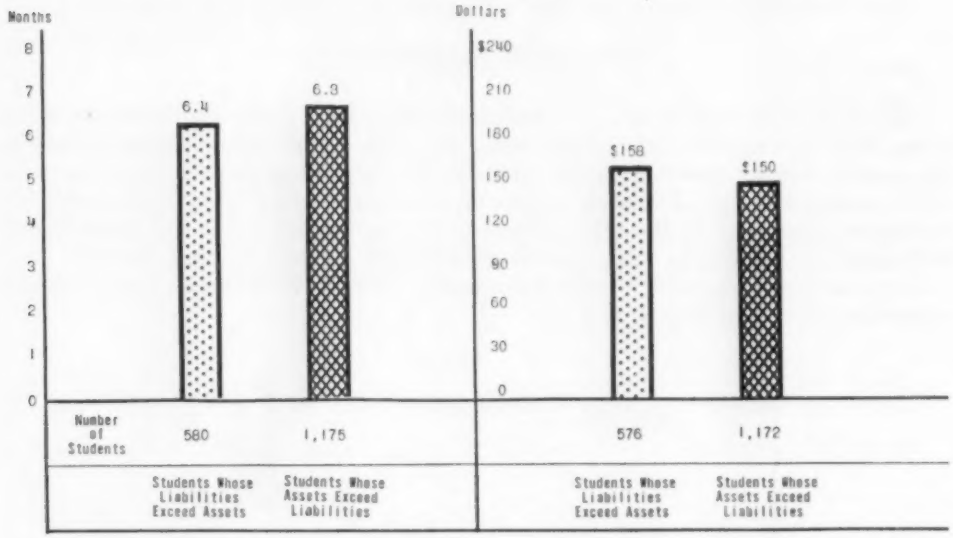


FIG. 2.—Average length of research fellowship and average amount earned per month as research fellow during medical school.

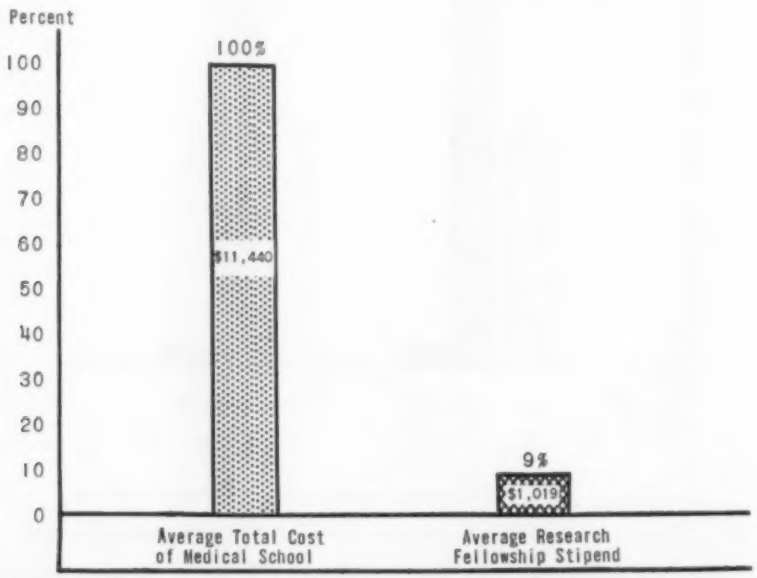


FIG. 3.—Relationship of students' cost in medical school and amount of research fellowship stipend.

Report

MEDICAL EDUCATION AND FACILITIES IN FIJI

M. L. RICCITELLI, M.D.*
School of Medicine, New Haven, Conn.

Fiji is a British Crown Colony consisting of some 322 coral-fringed islands, of which about 106 are inhabited. It has more than 300,000 inhabitants comprising many races, of which 45 per cent are native Melanesians and about a similar percentage are of Indian and Pakistanian origin. The rest are Europeans, Chinese, and Polynesians.

Fiji is the crossroads and hub of the South Pacific. It lies just below the Equator and is to the north of New Zealand. The islands are cooled by the tradewinds, have an average mean temperature of about 77° F., and have great natural beauty and charm.

The beaches are lined by palms and protected by an inshore reef. The islands abound in placid farm lands of sugar cane and pineapple, rice and cattle, rugged jungle-clad mountains, bananas and grass huts. Hibiscus, orchids, poinsettias, and other beautiful flowers grow wild everywhere and in profusion.

Suva is the capital and chief port. It is located on the south coast of Viti Levu, Fiji's largest island. It has a population of about 20,000, a beautiful harbor, a modern hydroplane base, good roads, and comfortable hotels.

The medical school is located in Suva and is part of the medical center which also includes the Colonial War Memorial Hospital with 275 beds and the Central Nursing School. Affiliated with the Central Medical School is the Tamavua Tuberculosis Hospital with about 300 beds, the Leprosy Sub-Station, the Mental Institution with about 100 beds, the Government Pharmacy and Laboratory, and the Mosquito and Yaws Central Center. Teaching is in English. The duration of the medical course is 5 years, and the graduates receive the title of "Assistant Medical Practitioners." They are appointed to the various medical and health services throughout the islands but are not allowed to conduct private practice. The school is financed by the local government. Recently, a grant has been obtained from England to cover the cost of a new maternity and outpatient department at the medical center.

There are now about 125 medical students in residence at the Central Medical School, of which about one-third are native Fijians, and the rest come from various other South Sea islands. The first female Assistant Medical Practitioners have recently qualified. Fijian students receive their tuition, board, lodging, clothing, books, and a personal allowance free of charge; the remaining expenses are financed by their own territories.

Entrance requirements vary, and no rigid standard is adhered to. In many of the islands the present high school education is inadequate. Fijian candidates for admission are required to have the equivalent of a high school education and on certification are admitted without further entrance examination. Other candidates are required to take entrance examinations.

* Clinical Instructor in Medicine, Yale University.

Those who fail are placed in a preparatory class conducted by the medical school and are given further instructions for a year or two. Students who have had less than 2 years of secondary high school education must take examinations in their own home territory before they are allowed to take the medical entrance examinations. Students considered unfit for medical courses may be diverted to one of the other training facilities available at the medical school, such as training as an x-ray technician, pharmacy assistant, laboratory assistant, health or sanitary inspector, or mosquito and filariasis inspector.

The school is administered by the Principal under the direction of the Director of Medical Services, who is also chairman of the medical school's advisory board. The academic board in turn submits its recommendations to the advisory board concerning the progress of the students and the curriculum which it keeps constantly in review.

The 5-year course consists of a premedical period and a preclinical period, each lasting 1 year, and a clinical period lasting 3 years. The premedical year is devoted to chemistry, physics, and biology. Emphasis is laid on those facts which have a bearing on future medical training. The preclinical year is devoted to anatomy and physiology, both theoretical and practical. In anatomy the whole body is dissected. Histology is taught with anatomy. Physiology and biochemistry are taught in close relationship to each other with practical work in both subjects occupying a considerable proportion of time.

The clinical period is divided into theoretical instruction in the school and practical work in the wards of the general hospital, the tuberculosis hospital, and the leprosy settlement nearby. Theoretical and practical instruction is given in pathology, medicine, bacteriology, materia medica, surgery, obstetrics, pediatrics, ophthalmology, dietetics, anesthesia, public health, and forensic medicine. Students serve as clinical clerks in the medical and surgical wards, in the ophthalmic outpatient department dispensary and in the operating rooms.

In the wards each student is assigned cases and required to maintain the patients' records. He receives instructions from the ward nurses in routine nursing procedures such as bed-making, sponging, dressings, and in keeping temperature records. In surgery he assists at any operation performed on his patients. In obstetrics he is instructed on *ante-* and *post-partum* care, in infant welfare, and in the conduct of normal labor, and he performs five deliveries under supervision.

In the outpatient department he receives practical training in minor surgery and in the administration of intravenous and intramuscular injections. In the eye clinic he learns the routine treatment of common eye diseases and injuries. He receives practical training in simple laboratory methods and learns how to do post-mortem examinations.

More and more emphasis is being given to preventative medicine, and the students are given three courses of lectures in this subject during their medical school career. They are also given practical demonstrations in the various phases of public health and are required to pass a qualifying examination in this subject.

Examinations are both written and oral during the courses, and qualifying examinations are given at the end of each course. Each qualifying examination is conducted by two examiners, one of whom is the lecturer on the subject.

The school also offers a 3-year course in dentistry. The entrance requirements are the same as for the medical course. Graduates of this dental course qualify as Assistant Dental Practitioners and are appointed to the government medical and health services.

Apart from medical and dental training, complete courses leading to a local certificate in

the following technical subjects are available at the Central Medical School and Fiji Medical and Health Department:

Pharmacy	3 years
Laboratory Assistant	3 years
Clinical Laboratory Assistant	1 year
Health (Sanitary) Inspector	3 years
Filariasis and Mosquito Inspector	6 months

Postgraduate and refresher courses are held in public health, nutrition, filariasis, tuberculosis, leprosy, obstetrics, and in maternal and child health.

The vast new teaching program has been greatly assisted by various international agencies. The World Health Organization has made many postgraduate fellowships available to the Island doctors, providing specialized training both in this country and in England. Under this plan Fijian doctors have been trained in radiology, thoracic surgery, public health, mental hygiene, psychiatry, and other specialties. Funds have also been made available for intensive research in filariasis and yaws, which are indigenous in the South Pacific. As a result of campaigns assisted by the World Health Organization, yaws has practically disappeared from the Fiji Islands, and the incidence of the disease has dropped from 28 per cent to less than 0.5 per cent. Filariasis still remains one of the major research medical problems. Studies have shown that at least four different types of mosquitos have been found to carry the filariasis parasite. Poor housing and excessive dampness due to the high rainfall are probably responsible for the high incidence of rheumatic fever. Children are seen in the hospital wards with far advanced lesions of the heart. This problem is receiving increased attention by the Central Board of Health and its 22 Local Health Authorities by teaching the natives the essentials of hygiene and sanitation.

After its discovery by Abel and Tasman in 1643, Fiji was ceded to Britain by the Fijian chiefs in 1874. Four years later the Indian immigration made necessary large-scale vaccinations of the indigenous population against smallpox. Since there were not enough qualified doctors a number of native youths were trained to do vaccinations and carry out simple quarantine measures.

About 10 years later it was decided to give suitable young men 3 years of hospital training to do this work. After completing this training they received a certificate of Native Medical Practitioner and acted as auxiliary medical workers especially in the remote rural areas. In 1928 the Suva Central Medical School was established, and the title of the graduates was changed to Assistant Medical Practitioner. The new school opened its doors to students from other South Pacific islands.

The hospitals today are modern, and the quality of the work, both medical and surgical, is of a very high standard. The Public Health Service is very well organized. The Colony is divided into 48 areas, each having an Assistant Medical Practitioner at a Rural Hospital or Rural Dispensary, and each is responsible to the health officer in matters of communicable diseases. During the past number of years there has been a steady and continuous decline in all the communicable diseases peculiar to the Fiji Islands.

Communications

AN INTERDISCIPLINARY APPROACH TO THE FIRST YEAR COURSE IN PSYCHIATRY

LOUIS D. COHEN, PH.D.*
Departments of Psychology and Psychiatry, Duke University, Durham, N.C.

The teaching of behavioral sciences to first-year medical students by the Department of Psychiatry at the Duke Medical Center took on a new character about 7 years ago when a psychologist, a sociologist, and an anthropologist were brought into the program.

Originally the course was patterned after that at the Johns Hopkins Medical School. One hour a week for one quarter of the first year was devoted to the presentation of certain basic psychobiological concepts such as physique and character, intelligence, emotions, the basic defense mechanisms, and certain illustrative case histories.

The course was revised and expanded in order to meet the following needs: The orderly presentation of behavior development from birth through senescence; the effects of emotions on body function; more extensive consideration of the living human organism as a behaving unit; consideration of the effects of normal daily living on health, disease and body function; the role of stress and deprivation in disease formation; a sound experimental basis for the content of the course, and a laboratory type experience.

At the present time the 72-hour course involves 58 lectures given twice a week with seven 2-hour laboratory periods coordinated with the lectures in the winter.

The course has been coordinated by the Director of the Division of Medical Psychology of the Department of Psychiatry. Anthropologists, pediatricians, psychiatrists, psychologists, and sociologists have carried the bulk of the teaching. Presentations have also been made by anatomists, internists, surgeons, and other medical and preclinical specialists.

The content of the course.—The course is divided into lectures and laboratory demonstrations. The lectures follow a topical sequence from birth through senescence, and currently are presented by four major disciplines—pediatrics, psychiatry, psychology, and sociology. The emphasis is on the normal course of growth and development, and upon those natural life situations which may result in organ or organism breakdown and disease. The laboratory demonstrations include a sequence of presentations of normal children and an occasional child whose development has been retarded for one or another reason. Methods of observation and measurement are emphasized. A second series of laboratory presentations, in the process of being developed, is designed to illustrate the psychophysiological functioning of individuals under various emotional and stressful situations. It is hoped that soon there will be a number of polygraphic recording units to demonstrate to small groups how organ systems respond differentially to different social and emotional problems and crises.

* Professor of Psychology and Medical Psychology; Director, Division of Medical Psychology, Department of Psychiatry.

Much of the curriculum content recommended in 1956 by the Committee on Medical Education of the American Psychiatric Association (1) had been included in the course. A considerable amount of time is devoted to concepts relating to early childhood development. Through careful documentation of experimental findings from animal and infant studies we introduce the topics of genetics, imprinting, critical periods, and the effects of early experience on later development. We then turn to the effects of deprivation and stress during early childhood. Throughout the presentations there is continuity of information on physical development and maturation. Special treatment is given to methods of modifying behavior (learning) with emphasis on conditioning and problem-solving. Within the developmental sequence the formation and growth of language, the role of perception and selective perception on the child's understanding of the world, the child's appreciation of the world about him in Piaget's terms, are discussed, as well as problems of sexual and social role identification in the preschool and adolescent periods.

Coincident with this sequence is a series of lectures on the development of personality, with Erikson's (2) and Witmer and Kotinsky's (4) eight stages of man used as the model. Freudian developmental concepts are integrated into the schema, and a broad sociocultural psychoanalytic view provides the theoretical framework.

An extensive series of lectures is presented on the psychophysiological correlates of stress and differential body reactivity which is coordinated with the first-year presentation of neuroanatomy and neurophysiology.

Because of the intensive research at Duke into problems of aging it is possible to bring in a number of older people to illustrate and highlight discussions of the problems of aging as it may reflect upon good and poor health.

One very successful feature of the demonstrations has been the illustration of the role that social, psychological, and biological factors play in the etiology course, and treatment of the illness of a single patient. These demonstrations have been conducted by a special research team in the Department of Medicine and have proved very successful in relating the course material to the immediate problems of medical practice.

Course mechanics.—No single textbook is available to cover the material. Thus, extensive reading lists have been prepared, and assignments of especially critical articles have been made at 5- to 6-week intervals. Four examinations are conducted during the course, coming at the close of natural units of lecture material. The laboratory demonstrations provide an opportunity for small group interaction, since the large class of 76 students (plus graduate students in the preclinical sciences) is broken down into smaller groups of approximately twelve to sixteen students. These laboratory groups develop a freedom of expression which is helpful not only for clarifying central issues but also for encouraging occasional free ranging discussion of problems of concern to the students themselves.

The role of the different disciplines.—Each of the disciplines has a unique role: the pediatrician describes and demonstrates normal growth and development, using newborn infants and children coming in for well baby clinics and occasionally, for purposes of comparison, a child whose development has been retarded.

The psychiatrist conceptualizes the meaning of normal and abnormal, discusses the effects of life stress on the course of development, and is especially responsible for the material on psychophysiology.

Sociology and anthropology contribute concepts of cultural relativity, contrasting developmental patterns in different societies and at different sociocultural levels in the American

society, with a view to broadening the perspective on differential patterns of child-rearing and their effect on personality. They also deal with the formation of role images and of the social concept of self.

Psychologists present the material on growth and development of behavior; personality development, personality theory, learning, language and thought, emotions and motivation, perception, and the measurement of behavior, intelligence and personality.

A Departmental Committee composed of representatives from psychiatry, psychology, and sociology has been responsible for coordinating the presentations. Relevant research by members of the medical school faculty is brought to the attention of the class through guest lectures by the investigators.

Discussion.—Probably the major concern of the instructors is that there is still the need for presenting the material in lecture form because of the size of the class and the vast content to be covered. We hope to be able to work out methods whereby the groups can be smaller in size and the presentations more informal with greater opportunity for teacher-student interaction.

Film presentations, while carefully organized, seem to be less popular than live demonstrations of children and adults, despite occasional inability to use live material with as great effectiveness for demonstrating a full range of phenomena. This illustrates again the keen interest on the part of the student to get as close as he can to the live patient with a real problem.

At this time in the re-analysis of medical school practices and of consideration of the role of the social and behavioral sciences in medical education, organization patterns at one medical school that have had time to be tested may be of general interest. The disciplines of psychology, sociology, and anthropology, rather than constituting a separate Behavioral Science Department for the Medical School, are organized into the Divisions of Medical Psychology and Medical Sociology under the Department of Psychiatry and integrate their teaching under its general direction. This provides for unified direction of all behavioral science teaching and facilitates contributions by these sciences to all stages of medical education, clinical as well as preclinical. The effectiveness of this model, at least as an example of interdisciplinary functioning in a common teaching aim, needs to be watched and compared with the pattern suggested and about to be activated in the Behavioral Science Department at the University of Kentucky (3).

REFERENCES

1. Committee on Medical Education of the American Psychiatric Association. An Outline for a Curriculum for Teaching Psychiatry in Medical Schools. J. M. Educ., **31**:115–28, 1956.
2. ERIKSON, E. H. Childhood and Society, New York: Norton, 1951.
3. STRAUS, R. A Department of Behavioral Science. J. M. Educ., **34**:662–66, 1959.
4. WITMER, H. L., and KOTINSKY, R. Personality in the Making. New York: Harper, 1952.

USE OF THE PUNCH CARD IN BUDGET CONTROL AND PERSONNEL RECORDS IN THE MEDICAL SCHOOL*

JOSEPH K. HILL, PH.D.†

Punch cards systems have been developed at the Downstate Medical Center to improve the management of personnel records of faculty, staff, and students; to facilitate budget control and research grant accounting, and to provide administration with useful information.

The entire faculty appointment procedure is handled accurately, quickly, and efficiently with punch cards which require the typing of the pertinent information only once. The processing of faculty appointments through committees and university administrative channels has been speeded and made more accurate. By selective sorting and card counting a wide variety of current statistical information may be had: for example, the ratio of faculty to technicians; employee turnover in various job categories; ratio of senior personnel to junior personnel; and so forth.

Medical Center personnel rosters for use by library, maintenance department, medical center receptionist, and telephone operators are readily available and current. The identification and listing of persons requiring protection against radiation hazards or other such laboratory hazards have been facilitated. The processing of employee time records has been made automatic with a substantial reduction in clerical time.

The job of preparing budget requests and justifications; of making allocations; and of maintaining budget control has been greatly facilitated by the use of punch cards. Various portions of an assembled salary may be easily handled in budgeting. Departmental budgets may be quickly summarized to form the basis of the over-all medical school budget. In a matter of minutes it is possible to have minimum, maximum, and mean salaries, categorical costs, and many other important facts needed for good budgeting.

Rapid and accurate accounting for research grant expenditures and research service costs such as photography, statistical, animal care, electronics design and so forth, has been made possible. Paper work formally required of technical personnel has been cut to a minimum. Academic department chairmen have a better picture of service costs, and service departments have a better basis for ordering supplies, adjusting work loads, and setting prices.

From punch card data preventive maintenance has been improved by identifying trouble spots before they become chronic, adjusting work loads, scheduling crews, and ordering supplies or parts.

Student punch card records are more useful by making pertinent statistical information quickly available.

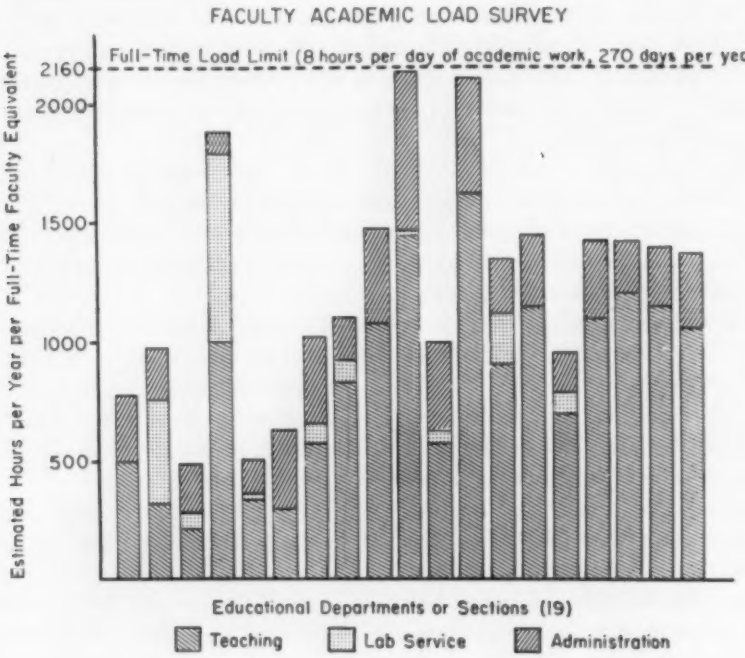
Since card punching and machine operations are carried out by regular personnel of the research statistical center and since no additional machines are necessary, the cost of these administrative punch card systems has been low.

* The full paper of this communication, together with illustrations, is available in mimeographed form for those who care to write directly to the author.

† Executive Assistant to the President of the Downstate Medical Center, State University of New York.

Erratum

The following chart was inadvertently omitted from the article entitled "An Experiment in Faculty Self-Evaluation" by the Study Committee (Dr. Manson Meads, Chm.), which was published in the February issue of the *Journal of Medical Education*, pp. 175–78. For further explanation see text.



ABSTRACTS FROM THE WORLD OF MEDICAL EDUCATION

ANGELA SANCHEZ-BARBUDO, PH.D.
Abstract Editor

Aufgaben der Hirnforschung in der heutigen Neurologie (Brain Research and Today's Neurology). FRANZ SEITELBERGER, M.D. Wiener Klinische Wochenschrift, Vol. 72, No. 6, pp. 93–96 (Feb. 12), 1960.

Brain research as an independent discipline is of a relatively recent date (it is not even 100 years old). Its development is linked to the progress of the so-called *exact* natural sciences whose penetrating and revolutionary work we are witnessing today. The brain scientist is fully aware that he finds himself only at the outset of a road full of obstacles; he also knows that his findings, no matter how important, probably will never have the world-shaking effects produced by some recent discoveries in physics and chemistry. However, brain research may well become the expression of the exact and positive *Selbstbetrachtung* (self-study) of modern man, who, confused by the enormous new creations of the human mind seeks a new orientation, a higher form of knowledge on the workings of his noblest organ. In this paper (his inaugural lecture) Prof. Seitelberger (from the *Neurologische Institut*, University of Vienna) shows some of the tasks which confront present brain research, with the purpose, as he points out, not so much to give an idea of the variety and broadness of the whole working field, but rather in order to gain an understanding of the peculiar structure of its main problems. In spite of the under-estimation morphology is suffering nowadays (under the weight of the great accomplishments of biochemistry and physiology), it is still considered by the author to be the most solid foundation of that structure (the functional aspect of morphology, he says, is becoming clearer the better it succeeds in getting out of the macroscopic realm and penetrates into the microscopic and submicroscopic ones); neuroanatomy is stressed as its most indispensible discipline. In the field of brain research it is confronted with a series of difficulties inherent to the special structure of the brain, the most serious of them being due to the impossibility of separating the investigation of brain structure from that of its functioning. Neuroanatomy's greatest value for brain research consists in setting up its foundations, but it has also an immediate practical significance in neurosurgery (the applied science of the brain) which presents the unique opportunity of a live study of the human brain and is opening entirely new roads to research. Also examined in this paper is the close relationship which exists between clinical neurology and psychiatry on one hand, and *neuropathology* on the other. The latter, being concerned with the investigation of brain diseases, is also of vital importance for medical practice. However, its task to determine through histomorphological investigation, in single cases, the kind of disease present or the cause of death, can only be fulfilled under certain conditions which, briefly explained by Prof. Seitelberger, illustrate the complex situation and the special difficulties which confront the brain researcher. In general, it can be said that the tasks of today's neuropathology in the field of brain re-

search are oriented not so much toward the study of diagnostic problems but rather toward systematic studies apt to enlighten pathogenetics and etiology. The difficulties encountered on this path are also discussed in detail. A special challenge for the neurologist is seen in the study of the genetically conditioned degenerations of the nervous system.

Contribution of the Mental Deficiency Institution to the Training of Medical Students. ROBERT GIBSON, M.D. Le Journal de l'Association Médicale Canadienne, Vol. 82, No. 9, pp. 481–483 (Feb. 27), 1960.

The Manitoba school offers an example of how an institution of this type can make a valuable contribution to clinical teaching: for several years now it has served as a center for the teaching of mental deficiency to various groups, including medical students. Instruction for the latter, although provided to a large extent by the institution staff, forms part of the general course in psychiatry at the University of Manitoba. In spite of dealing only with certified mental defectives (only a fraction of the total number of retardates), the institution, with its school department, occupational training, and other areas, is capable of reflecting many facets of the broader field; in addition, it has at its disposal a rich variety of clinical material, part of which would not be ready available elsewhere. Since 1955, when the student program was begun, each month of the academic year one complete day is devoted to instruction within the institution. Groups of about ten students each come out to spend the day as part of their clinical clerkship in psychiatry. The syllabus consists at present of the following six lecture demonstrations: (1) basic principles (9:30–11:30 A.M.); (2) outline of intelligence testing (11:30–12:00); (3) occupational training (1:00–1:30 P.M.); (4) school activities (1:30–2:30 P.M.); (5) clinical types I (2:30–3:45 P.M.); and (6) clinical types II (4:00–5:00 P.M.). The first section comprises a brief survey of such topics as the nature of mental deficiency, grades, incidence, etiology, characteristics, and differential diagnosis. Intelligence testing outlines elementary concepts and demonstrates test material in common use. In "occupational training" the aims of such training are discussed, and the need is stressed to develop a satisfactory level of personal and social relations (this session includes a tour of the workshop and a demonstration of training methods in progress). The subsequent hour includes a demonstration of sensory training at different levels. Speech therapy is another feature which receives a good deal of attention in view of the prevalence of speech defects in children already handicapped by mental deficiency. The remaining two lecture-demonstrations are mainly concerned with individual clinic conditions (common types like familial or subcultural defect, mongolism, minimal brain injury, and cerebral palsy are never lacking). Patients are demonstrated individually or in series (according to age, for instance). Although the number of separate entities which can be demonstrated in one afternoon is limited, these clinical periods, it is pointed out, afford a valuable opportunity to draw attention to the wide range of conditions in mental deficiency, as well as to the increasing expansion of biochemical and other forms of research in this field.

Der Einfluss der Krankheiten nach Art und Häufigkeit auf das Krankenhaus (The Influence on the Hospital of the Different Types of Disease and Their Incidence). ERICH SCHRÖDER, M.D. Deutsches Medizinisches Journal, Vol. II, Heft 1, pp. 24–26 (Jan. 5), 1960.

The author, professor of Social Hygiene and Public Health at the Free University, Berlin, reviews in this paper the history of the hospital as an institution (with special emphasis on the history of German hospitals). Although the Christian concepts of neighborly love and charity played a great role in the origin of this institution later on, its ideologico-cultural background did not further hospital development as much as could be expected. This, the author points

out, is attributable largely to the setback the hospitals suffered during the great waves of epidemic diseases (the plagues) which made mortuaries of the hospitals; furthermore, the Christian idea of "helpfulness" which stimulated the founding of hospitals was soon reduced to the idea of "neediness," attaching the stigma of indigency to all hospital patients (a sort of social defamation, especially if one considers that, until the year 1920, in Prussia the recipients of public assistance were by law deprived of their right to vote). Industrialization, with the increase of city population, at first worsened the hospital situation (the high rate of infant mortality was one expression of this situation which contributed to the outbreak of the German revolution of 1848). However, even the social and political changes brought forth by upheaval would not have greatly affected the hospital institution if it had not been for the breakthrough of the scientific trend in medicine (with Rudolf Virchow as one of the foremost representatives of the new direction; he also played an important role in the new political organization of post-revolutionary Germany). Medico-scientific research carried in its wake city sanitation and public health measures which put an end to the "infectious hospitalism," while social and health insurances enabled the working class, at least to a certain degree, to make use of the hospitals without having to recur to charity or public assistance. Thus, in the second half of the 19th century, the hospital is gradually taking over all public health organization. Prof. Schröder follows in detail as an example the hospital development in Berlin during the last 100 years, which shows clearly the influence exerted by changes in the social structure; the relation of hospital organization to demographical movements (the problems created by today's gerontology and geriatrics must necessarily draw special attention from scientific medicine as well as from hospital organization); the role played by certain diseases, etc. To the interplay of clinical, social, political, and demographic influences on the hospital functions must be added still the continuous flow of diagnostic and therapeutic progress. The author recalls that, 50 years ago, even a very "modern" hospital did not possess x-ray facilities, which only could be integrated into hospital organization, not without considerable difficulties, during the period of 1920–1940. Now the prospect of the use of atomic energy for medical purposes opens such a wide horizon that no planning seems possible as yet. This brings the author to the most important question, namely: if—and how far—the hospital as an institution can meet the demands put upon its organization by the constant functional changes? It is made clear that for today's hospitals to be adequate to their enormous tasks, technical, medical, and organizational know-how, although indispensible factors, are not enough: hospital organization at its best needs long-range planning which can only be successful under conditions of economical and political stability and, above all, in times of peace. To demonstrate the disastrous effect of war on the hospital as an institution, Berlin during two world wars and their aftermath serves again as an example.

Early Medical Education in England in Relation to the Pre-History of London University. CHARLES SINGER and S. W. F. HOLLOWAY. Medical History, Vol. IV, No. 1, pp. 1–17 (Jan.), 1960.

Medical education in England has a very different history from that of any other country (even from Scotland and Ireland): in England, and in England only, medical teaching was not immediately related to the universities. Up to well after the middle of the 19th century medical training was concentrated in London where no universities existed until 1828, and no university hospital till 1834. The foundation of the medical school and hospital that now bear the name of *University College*, originally called the *University of London*, occurred at a turning point in the social and intellectual history of medicine in general and of medical education in England in particular, that cannot be

understood without considering the background on which it arose. Therefore, rather than with the history of London University this paper deals with its "pre-history," that is, the development of scientific medicine in England and the reform movements which led to its foundation. Discussed are the early influences of foreign schools on the development of English scientific medicine, principally those of Paris, Leyden, and Edinburgh; the predominant role in medical organization played by two professional bodies, the Royal College of Surgeons and the Society of Apothecaries; the organization of "apprenticeship" and hospital training in the late 18th and 19th centuries (an idea of what the situation in London hospitals in the first half of the last century was like can be gained through Benjamin Golding's *Historical Account of St. Thomas Hospital*, published in 1819), and also examined in detail is the different status and position held by surgeons and physicians, and the influence on London medical practice of the College of Physicians (to practice in London and surroundings a physician had to receive the licensure of that body which had legal power—rarely exercised—to prevent others from practicing in the area). The greatest grievance against the College of Physicians in the first half of the 19th century was that, with all the prestige of its ancient standing, not only did it do nothing to further medical education but for a long time even obstructed the moves for adequate licensure and for the establishment of a teaching university. As to the reform movements which led up to its foundation in the first half of the past century: The paper deals also in detail with the question of general practice and the status and position of the "apothecaries," which were both raised and regularized largely thanks to the persistent efforts of George Man Burrows (1771–1840), a member both of the Society of Apothecaries and of the Royal College of Surgeons, who, visualizing more clearly than anyone else at that time the proper status of those today known as "general practitioners," helped bring to a successful conclusion the movement for legal recognition as medical advisers of *licensed* members of the Society of Apothecaries. There was no further important legislation affecting the status of the general practitioner until the establishment of the General Medical Council in 1858. Also discussed in this study are the repercussions of the Industrial Revolution and the dominant economic and philosophical doctrines on the development of medical education in England: while the foundation of the 19th-century medical schools of London could be considered as the remote outcome of the utilitarian point of view that emanated from the theories of Bentham and Adam Smith, the history of a pioneer institution such as the University of London, in which scientific medicine was taught, can be displayed without too extended a discussion of its philosophical basis, since the change in medical teaching from the empiric to the scientific, to which it owes its existence, was made possible "because ordinary people of moderate means and moderate intelligence began to suspect that their health was not being as well cared for as it might be." Finally, the authors give a brief glance to the comparative status of 19th-century medicine in London as against that in Paris: There was a notable inferiority of anatomy instruction in London; there was in Paris the great *Musée d'Histoire Naturelle*, where the principles of comparative anatomy had been founded by men like Lamarck, Cuvier, and Geoffroy St. Hilaire. On the other hand, despite the tradition of the Hunters and despite a series of admirable clinical observers, London, in the first decades of the 19th century, had none who would influence medical thought broadly and deeply. The realization of the scientific inferiority of London to Paris and other continental centers was no doubt another factor in the movement which led to the foundation of London University.

Neural Pathology: A Pathogenetic Concept of the 18th and 19th Centuries. GERNOTH RATH. Bulletin of the History of Medicine, Vol. XXXIII, No. 6, pp. 526–541 (Nov.–Dec.), 1959.

When William Cullen published in 1776, in Edinburgh, the first volume of his *First Lines of the Practice of Physic*, he introduced into medicine a new pathogenic concept which ascribed to the nervous system the dominant role in pathology. This concept was labeled "neuropathology" in the 19th century. Not only does this name come very close to our contemporary "neural pathology," but the underlying concepts, too, show surprising similarities (a special kinship seems to exist between Cullen's pathogenic concept and the *Relationspathologie* of Gustav Ricker, and also with the Russian Speranski's school). The development of Cullen's ideas and the ensuing struggle between cellular pathology and neural pathology in the 19th century are followed closely in this paper. Cullen's theories having at first fallen on fertile grounds in England, France, Italy, the United States, and especially, in Germany, it was in the latter, precisely, that their collapse was brought about, largely through Virchow's *Cellular Pathology*, which banished neural pathology from medicine for many decades (in the second half of the 19th century only one concept was current among doctors throughout the world: the cellular pathology of Rudolf Virchow). However, 20th-century medicine has again raised the question of the part played by the nervous system in the vital process and has been attempting to solve it by applying experimental methods. While this seems to vindicate those 19th-century physicians whom Virchow scorned as "neurists," the author points out that, from a strictly historical point of view, it appears now right and proper that the scientists of those days initially should have turned their attention away from the pathogenic theories of their time—founded on then unproved hypotheses—because a different approach, such as the study of pathological changes in the organs, was bound to yield greater fruits.

Problems and Prospects of the Social Sciences in Medical Education. E. GARTLY JACO, PH.D. Journal of Health and Human Behavior, Vol. 1, No. 1, pp. 29–34 (Spring), 1960.

In this paper (part II of an inter-university symposium on *Training for Social Knowledge*, in six parts, published in this same issue), the author, of the Cleveland Psychiatric Institute and Hospital, discusses the future of the social sciences in medical training. He states that, although clinical psychology and social work have had "service" roles in the medical field for a long time, the acceptance of sociology, anthropology, and social psychology as valuable contributors to teaching and research in medical schools is of a much more recent date. Nor is this acceptance anywhere near complete (in most medical schools, the relationship of social science to medicine is, as the author puts it, "more like a courtship, with marriage yet to be consummated"). An analysis of the obstacles to complete integration of the social sciences into the medical curriculum shows that most of the problems involved are related essentially to difficulties in communication and appreciation among social scientists and medical men. These difficulties, on the other hand, can be derived mainly from two sources: (*a*) the nature of the medical tradition and (*b*) the present state of development of the social sciences. The basic obstacle, perhaps, is seen "in the nature and orientation of the medical subculture as a part of the American tradition," which assumes that the individual is free in his environment (the term environment itself may have different connotations in the medical and the social science fields). According to this tradition, the socio-cultural environment influences the patient only to the extent that he allows it to compromise a component of his nature and being. In the biophysical frame of reference, the belief (a historical product of Western civilization) is that *man is born human* and does not develop his human nature in primary group relations. Human nature, furthermore, is regarded as including only the human organism and its internal environment; its components are *biological*, not

socio-cultural (under this influence, medical students readily accept the formulations of a geneticist, as, for instance, in the case of the high incidence of sickle-cell anemia among Negroes, but tend to reject the idea that the prevailing cultural patterns also contribute to a perpetuation of this disease among the same population group). Another obstacle is seen in the contemporary "role-image of the physician" in the minds of both society and the practitioner himself, according to which image the physician is viewed essentially as one to whom a person turns for relief or removal of physical pain or malfunctioning. The patient—as well as the doctor—regarding illness as essentially an organic condition, is either reluctant or unable to comprehend the impact of the environment on his health. The physician's concept of his own role is conditioned by the "position and action pattern" accorded to him by his own society. Also discussed in this paper are the failures in communication growing out of the present state of development of the social sciences (here the difficulties arise mostly from the "factionalism" among the latter, and also from the gaps which still exist between "pure" social sciences and the more problem-oriented components of various disciplines). As to the prospects of the social sciences in medical education, although all these difficulties are not believed to be insurmountable, they must be fully understood by the social scientist in medicine before he can hope to overcome them. It is also pointed out that those who advocate their integration into the medical curriculum hold that the present basic medico-biological sciences are *insufficient* to train the physician to cope with the socio-cultural and personal components of medical care. Sociology, cultural anthropology, and social psychology, on the other hand, are believed to be particularly apt to fill these needs (it is suggested that social science's most valuable contribution to medicine may lie in the field of ecology and social epidemiology). The particular needs of medical schools are likely to enhance the prospects of acceptance of the social sciences. However, the author is of the opinion that the major instrument of the social sciences in gaining acceptance and integration in medicine is the development of a body of knowledge based on a solid foundation of scientific inquiry and experimentation. The logical development of the present status of the social sciences in medicine, as he sees it, will lead to the establishment of an autonomous department of human behavior and cultural medicine within the medical school.

NEW BOOKS

KENNETH E. PENROD
Book Review Editor

Abstracts

Communicable and Infectious Diseases—Diagnosis, Prevention, Treatment. By FRANKLIN H. TOP, with 21 Collaborators. 4th ed. St. Louis: The C. V. Mosby Co., 1960. 476 pp. 122 figures. $20.00.

This book is intended as a text or handy reference for all persons whose professional duties necessitate contact with certain communicable diseases or infections. An attempt has been made to present the material as concisely as possible. This edition consists of new, completely rewritten, and revised chapters. The following new chapters have been added: Acute Respiratory Infections, including adenoviruses and the common cold; Enteroviruses: Coxsackie and ECHO; Virus Infections; and Staphylococcal Infections. Chapters completely rewritten by new authors are Chemotherapeutic and Antibiotic Agents, Management of Communicable Diseases in the Hospital, Management of Communicable Diseases in the Home, The Bacterial Pneumonias, Influenza, Infantile Diarrhea Due to Enteropathogenic *Escherichia coli*, Gonorrhea, The Leptospiroses, and Rickettsial Diseases. The remaining chapters have been revised to include recent changes.

Encyclopedia of Medical Syndromes. By ROBERT H. DURHAM. New York: Paul B. Hoeber, Inc., 1960. 613 pp. $13.50.

In this volume is presented in an editorial style a comprehensive reference text of medical syndromes with an accompanying list of correlated synonyms. The text includes cross references to associated or related subjects. This is the first such encyclopedic reference text of eponymic and descriptive syndromes available in the English language. The plan of presentation has been designed to provide interest appeal for the casual reader as well as for the specialist in medicine. Because of the variety of subjects discussed, this collection should be of interest to many groups including teachers, internists, endocrinologists, neurologists, dermatologists, pediatricians, and roentgenologists as well as to candidates for American Board examinations in the various specialties.

The Older Patient. Edited by WINGATE M. JOHNSON, with 21 Contributors. New York: Paul B. Hoeber, Inc., 1960. 564 pp. $14.50.

This book is planned not as a textbook on the practice of medicine but to complement such works. The volume is intended to be of use to the internist and the general practitioner in caring for their older patients. It deals not only with the principal physical ailments of elderly people, emphasizing the diagnostic and therapeutic aspects, but also with their socioeconomic and emotional problems.

Northwestern University Medical School, 1859–1959. By LESLIE B. AREY. Evanston: Northwestern University, 1959. 467 pp. $7.50.

The author of this work is Professor Emeritus of Anatomy at Northwestern University and a faculty member for the past 45 years. In anticipation of the observance of the Centennial of the Medical School in 1959 Dr. Arey was requested to prepare this historical work tracing the development of the school during that total period. The book is, however, not just a history of a local school. Dr. Arey reviews and integrates the history of Northwestern Medical School with that of medical education in America during the past 100 years. He also shows that the history of this school is unusually important because it involves the institution of so many reforms in medical education that were adopted generally and have become standard practice throughout the United States.

Cosmetic Surgery—Principles and Practices. By SAMUEL FOMON. Philadelphia: J. B. Lippincott Co., 1960. 642 pp., 608 illustrations. $27.50.

The rise in demand for this kind of surgery has resulted in a vast number of contributions, both in English and in other languages. Faulty concepts have been corrected, and techniques have been simplified and standardized, so that many procedures formerly of value to only a small group of specialists can now be carried out effectively by any surgeon willing to acquaint himself with the precepts laid down. Unfortunately, the material is not readily available in its present scattered state—hence the reason for this textbook, devoted exclusively to cosmetic surgery with its special problems, which should fill a genuine need at this time. Since today no unanimity of opinion as to the dividing line between cosmetic and reconstructive surgery exists, the author has arbitrarily limited his discussion of operations to those designed to alter contour, solely for the purpose of improving appearance. Those procedures in which the objective is the restoration of function are treated only briefly. Considerable space is allotted to a rather detailed discussion of the external nose and the facial skin in view of the increasing interest in these regions. A chapter is devoted to wounds to guide the general practitioner in the selection and the proper application of the most approved techniques. The subjects discussed include anesthesia, hemostasis, suturing, preoperative care, etc. Instructions are also given for the care of many cosmetic lesions, such as nevi, angiomata, sebaceous cysts, fibromata, lipomata, small scars, etc., which can be treated in the office without elaborate equipment. To conserve space, bibliographic citations have been reduced to a minimum. In approaching each section, an attempt is made to present the surgical anatomy of the respective part, to serve as background for the operative procedure. In many instances certain salient physiologic and pathologic factors are stressed, with a view to bringing into bolder relief the principles underlying the treatment or to group together operations based on a single principle. A résumé of the difficulties encountered and the manner of their solution in the past is offered in cases where it is felt that only in this way could the objectives of the present-day techniques be fully appreciated. Throughout the text warnings concerning the pitfalls which the beginner is likely to encounter are stressed. Clarity of expression and precision of detail have been given precedence over literary style.

Carter's Microbiology and Pathology. By ALICE LORRAINE SMITH. 7th ed. St. Louis: The C. V. Mosby Co., 1960. 696 pp., 316 illustrations. $7.50.

This edition, the first since the passing of Dr. Carter, is presented for the purpose of including information in rapidly expanding scientific areas which is becoming available today. Much of the material has been rewritten and rearranged. Special emphasis is given to certain practical applications of the science of microbiology in medicine, nursing, public health, and industry. One complete unit is devoted to the physical and chemical control of microbes. The unit on General Principles of Microbiology has been revised. The organization of Part II, Pathology, has been considerably changed. It is divided into two units—General Principles of Pathology and Special Pathology of the Major Organ Systems. The unit on General Principles of Pathology emphasizes, for teaching purposes, the major etiological categories of disease. In keeping with this approach a new chapter is included on Injuries From Non-living Agents. In this chapter an outline of poisons is given, the student is introduced to radioisotopes and certain uses of nuclear medicine, and pathologic concepts of radiation and atomic bomb injury are briefly discussed. In the unit on Special Pathology and the Major Organ Systems, an effort has been made to correlate wherever possible the anatomical changes with the changes in composition of body fluids which are measurable by modern laboratory techniques.

X-Ray Technology. By CHARLES A. JACOBI and DONALD E. HAGEN. 2d ed. St. Louis: The C. V. Mosby Co., 1960. 440 pp., 320 illustrations. $10.00.

In this edition there is a complete rewriting of the first seven chapters, with the addition of one new chapter, Principles of Radiographic Quality. Also, Chapter 18 of the first edition has been deleted. Many new line drawings are included, some to replace previous drawings and others to present theoretical concepts more graphically. An effort has been made to include all the material relevant to the field and to arrange the material in the sequence that will facilitate its use as a teaching tool.

Principles of Public Health Administration. By JOHN J. HANLON. 3d ed. St. Louis: The C. V. Mosby Co., 1960. 686 pp. $2.50.

In the revision of the previously existing material and in the selection of new material for this edition, an attempt has been made to reflect the spiraling rise in the standard of living and the fantastic increase in the numbers and types of material advantages which have accrued to the entire population. Based on a more direct consideration of the phenomenon of social pathology, recognition has been given to the increasingly important problems of chronic diseases, accidents, mental health, and the addictive diseases, and to the significantly increasing needs for social services and medical care. Beyond this, the obvious risk has been taken of concluding the volume with an attempted look into the future.

Typical Gynecologic Operations. With Special Consideration of Technical Advantages. By DR. SIEGFRIED TAPFER. Philadelphia: The J. B. Lippincott Co., 1960. 78 pp. $9.00.

This work is not meant to serve as a textbook. The object merely is to point up some technical advantages of which the surgeon can avail himself in performing these operations. The author has attempted to express in the simplest words and to depict as clearly as possible in the illustrations the technical details to which he subscribes in the typical gynecologic operations. Plates (168), based upon sketches made during actual operations, are the products of the closest coordination of effort by the author and an illustrator, and speak clearly and precisely in a language of their own that requires no translation. This 2d edition presents some revised illustrations and considers some operations not included in the 1st edition, but the principal objective of the author is unchanged.

Christopher's Textbook of Surgery. Edited by LOYAL DAVIS. 7th ed. Philadelphia: W. B. Saunders Co., 1960. 1497 pp., 1597 Illustrations. $17.00.

This textbook strives to place before the student an interestingly told story of the facts and principles which should form the basis for his education in surgery, so as to stimulate him to continue his self education throughout his professional life. Each contributor to this 7th edition (of which there are 82) has aimed to present his subject in such a way that it will stimulate the young and older student of surgery alike to read further. In his own style of teaching and expression, each author has attempted to create a desire in the reader to learn more about the subject presented. This textbook makes no attempt at an encyclopedic coverage of the subject. It aims to aid the student of surgery of all ages to approach an understanding of surgical axioms properly. In this edition, the chapters on Infections, The Abdominal Wall and Peritoneum, Surgery of Peptic Ulcer, The Urinary Tract, Male Reproductive System, The Foot, and Amputations have been completely rewritten by new authors. A section on surgical judgment has been added. Important changes and additions which reflect the most recent advances have been made in the other chapters, each of which has been thoroughly reviewed, and most have been heavily revised.

Surgery in World War II. Volume II. Neurosurgery. Edited by R. GLEN SPURLING and BARNES WOODHALL, with 18 Contributors. Office of the Surgeon General, Department of the Army, Washington, D.C., 1959. Available through Superintendent of Documents, Washington 25, D.C. 650 pp. $7.00.

The first volume of the History of Neurosurgery in World War II, which was published in 1958, dealt with the administrative aspects of this specialty and with the management of head injuries and their residua. This 2d (and final) volume in the neurosurgical series deals with injuries and diseases of the spine and peripheral nerve injuries. A chapter on lesions of the intervertebral disc is included.

Principles of Orthopaedic Surgery. By PAUL C. COLONNA. Revised Edition. Boston: Little, Brown & Co., 1960. 783 pp., 500 figures. $22.00.

This specialty has been greatly broadened, and at present it is concerned with the physiologic function of the musculo-skeletal system as well as the prevention, correction, and investigation of injuries, diseases, and anomalies of this system. Its many problems require a correlation of the skills of the clinician, the pathologist, the radiologist, the biochemist, the physiologist, the physicist and the physical therapist in the rehabilitation of the child and adult. This

book is an outgrowth of an expansion of *Regional Orthopaedic Surgery*, published in 1950. It is aimed to be a help to the general practitioner as well as the specialist in bone and joint surgery. Emphasis is placed on trauma as well as on the chronic conditions ordinarily included in the term "orthopaedic surgery."

Pathology of the Heart. Edited by S. E. GOULD with 20 collaborators. 2d ed. Springfield, Illinois: Charles C Thomas, 1960. 1083 pp. $32.50.

The same breadth of approach evident in the 1st edition of this work prevails. A complete reset of the type has permitted a great many changes in sentence and paragraph structure, classification and terminology, paragraph headings, and an extension of the bibliography. A certain amount of alteration has been necessary to harmonize the presentation with new chapters. New chapters expand the over-all coverage considerably. The chapter on Conduction System clearly delineates widely accepted views and presents fairly adequately the few controversial aspects. The pathology of the aorta is now described sequentially and in a manner readily available for reference. A comprehensive presentation of histochemical procedures is a great value to any pathologist and is well adapted to the special study of the cardiovascular system. A perspective of the whole subject is provided by an historical review, with amplification in individual chapters, and suggested avenues for further study and research. The new chapters added are: The Conduction System, Diseases of the Aorta, Cardiopulmonary Disease, Surgery of the Heart, and Histochemical Procedures. The emphasis remains on correlation of the clinical and pathologic findings.

Anatomy—a Regional Study of Human Structure. By ERNEST GARDNER, DONALD J. GRAY, and RONAN O'RAHILLY. Philadelphia: W. B. Saunders Co., 1960. 955 pp. $15.00.

The major aims of the present work are (1) to provide a textbook that is sufficiently brief for the undergraduate medical and dental student during the present shortened course in human anatomy, (2) to provide information on living anatomy and to stress the importance of the relationship between structure and function, and (3), particularly by the citation of relevant references, to meet the needs of the more advanced student and the postgraduate worker. The regional plan of this book has been adopted chiefly because the vast majority of laboratory courses in human anatomy are based on regional dissection. Within any given region, however, a rigorous pursuit of the regional method, to the exclusion of systemic considerations, has not been attempted, because the present work is neither a laboratory manual nor a textbook of surgical anatomy. The special fields of neuroanatomy, histology, embryology, and comparative anatomy have been largely omitted, and the aspects that are included have been curtailed.

Newer Virus Diseases. Clinical Differentiation of Acute Respiratory Infections. By JOHN M. ADAMS. New York: The Macmillan Co., 1960. 273 pp. $5.75.

In order to aid the practicing physician, this book has been designed to inform the reader of the epidemiologic and clinical features of the various influenza-like diseases, with emphasis on etiologic diagnosis, rather than anatomic, as a basis for wise therapy. Influenza, a prototype respiratory disease of viral origin, is dealt with in considerable detail. Emphasized are its epidemic features, the various types and strains, the potential for secondary bacterial complications, the pathology of the uncomplicated disease, the high mortality in infancy and old age, and the possible relationship to sudden unexpected deaths in the early months of life. Also discussed are the new "myxo-viruses," the parainfluenza viruses, as well as other respiratory viruses and the diseases which they cause. The new adenovirus infections are presented in detail, with emphasis on the clinical diagnosis of the various types of infection, their prevention, and their relationship to the general problems of common respiratory disease. A separate chapter is devoted to diseases caused by the newly named enteroviruses, which include the two large groups of Coxsackie, the polioviruses, and the recently discovered ECHO viruses. Several chapters deal with entities such as infectious mononucleosis, Q fever, and psittacosis, wherein respiratory symptoms and signs are often the predominant feature. Scarlet fever, diphtheria, and pertussis are discussed in a chapter devoted to bacterial infections of the respiratory passages, and emphasis is given to group A beta hemolitic streptococcus as a major cause of primary pharyngitis due to bacteria. Finally, a chapter has been devoted to the common cold as

a possible entity, even though it is recognized that every disease under discussion in this book at some time in its development may mimic the symptoms and signs of what is commonly called "cold." Also included is a brief discussion of allergic rhinitis and its relationship to the common cold.

Glaucoma. Trans. 4th Josiah Macy, Jr., Found. Conference, March 8, 9, and 10, 1959, Princeton, N.J. Edited by FRANK W. NEWELL, with 20 participants. New York: Josiah Macy, Jr. Found., 1960. 244 pp. $8.00.

The material included in this conference was: "The Fine Structure of the Normal Trabecular Apparatus in Man," "Ultrastructure of the Normal Trabecular Apparatus in Man," "The Role of the Trabecular Structure in the Problem of Simple Glaucoma, Particularly with Regard to the Significance of Mucopolysaccharides," "The Fine Structure of the Ciliary Epithelium and its Relationship to Aqueous Secretion," and "Pathologic Findings on Six Eyes with Primary Glaucoma."

Methods in Medical Research. Editor-in-Chief, H. D. BRUNER. Volume 8. Chicago: The Year Book Publishers, Inc., 1960. 351 pp. $9.75.

This volume of the well known series is divided into three sections. Section I, "Live History of the Erythrocyte," is under the direction of Walter S. Root. Section II, "Measurement of Responses of Involuntary Muscle," is under the direction of A. M. Lands. Section III, "Peripheral Blood Flow Measurement," is under the direction of H. D. Bruner.

Childbirth without Pain. By DR. PIERRE VELLAY. Translated from the French by Denise Lloyd. New York: E. P. Dutton & Co., Inc., 1960. 216 pp. $3.95.

In this volume the author has attempted to include everything about the psychoprophylactic method of childbirth without pain that would interest a pregnant woman who knows nothing of the method. An effort has been made to write concisely and in a way that will be intelligible to every reader. The main principles have first been considered, then to the practical side. The lectures have been presented exactly as they were delivered.

Biochemistry of Human Genetics. Ciba Foundation Symposium Jointly with The International Union of Biological Sciences. Edited by G. E. W. WOLSTENHOLME and CECILIA M. O'CONNOR. Boston: Little, Brown & Co., 1960. 328 pp. $9.50.

This year, for the first time, the Ciba Foundation has organized a series of conferences in places other than London. The first of three such conferences, on a small scale and in the informal style characteristic of the Foundation, was held in Naples, Italy, May 13–16, 1959. This volume contains the papers and discussions contributed by the group gathered there, attended by 29 participants. The present conference was comprised of sixteen papers with discussion, plus a general discussion.

Significant Trends in Medical Research. Ciba Foundation 10th Anniversary Symposium. Edited by G. E. W. WOLSTENHOLME, CECILIA M. O'CONNOR, and MAEVE O'CONNOR. Boston: Little, Brown & Co., 1960. 335 pp. $9.50.

This conference was arranged by Sir Henry Dale and held in June, 1959. There were 30 participants and sixteen papers, each with its discussors. Each speaker was invited to select those developments in the past 10 years which he believed would prove to be the most significant in the next 10 years. As might be expected, the subject material varied widely.

The Lifespan of Animals. Ciba Foundation Colloquia on Ageing, Volume 5. Edited by G. E. W. WOLSTENHOLME and MAEVE O'CONNOR. Boston: Little, Brown & Co., 1960. 311 pp. $9.50.

This colloquium was held in April, 1959, and was attended by 27 participants. It consisted of fourteen papers with discussions. In addition, this volume contains the combined index of this and the previous four volumes on this subject.

Cancer of the Cervix—Diagnosis of Early Forms. Ciba Foundation Study Group No. 3. Edited by G. E. W. WOLSTENHOLME and MAEVE O'CONNOR. Boston: Little, Brown & Co., 1960. 110 pp. $2.50.

This conference, held May 8, 1959, was attended by 23 members of the Study Group, fourteen of whom contributed material to this volume.

Freud and Dewey on the Nature of Man. By MORTON LEVITT. New York: Philosophical Library, 1960. 175 pp. $3.75.

The author has discussed the development and contributions of Sigmund Freud and John Dewey with an emphasis on their closely paralleled and complemented contributions, without apparently having ever met or crossed. This study of two seemingly opposed but essentially complementary approaches to human nature will, it is believed, further the contemporary revision in our thinking. It will be especially interesting and valuable for those who are interested in psychoanalytic ideas and those who are concerned with learning and education.

Handbook of Neurological Diagnostic Methods. Edited by FLETCHER MCDOWELL and HAROLD G. WOLFF. Baltimore: The Williams and Wilkins Company, 1960. 201 pp. $4.50.

This manual is an outgrowth of the educational concepts of the Department of Medicine of the Cornell Medical College. In brief this philosophy involves all aspects of medicine as they apply to man's health and disease. This manual pertains to the development of adequate knowledge and how to approach the problems of the nervous system. The authors state that, in keeping with the usual traditions of teaching, they place great value on an orderly, full, pedantic, stepwise procedure when learning techniques. Later, familiarity, experience, and intuition will tell when to leave out steps and where to concentrate, using then even greater refinement and detail. To collect the facts of function or its disorders first, and then possibly to draw inferences concerning their anatomical, physiological, and pathological significance that may ultimately lead to a formulation and a plan of therapeutic procedure, is the goal of this manual of neurological diagnostic methods. In all, the authors acknowledge the contributions of 32 present and past members of the Neurological Division of the Department of Medicine of Cornell University Medical College.

Explorations in the Physiology of Emotions. Edited by LOUIS J. WEST and MILTON GREENBLATT. Psychiatric Research Reports Number 12, The American Psychiatric Association. Washington, D.C.: American Psychiatric Association, 1960. 271 pp. $2.00.

In April, 1957, a group of more than 100 scientists, clinicians, and students were present at the APA Regional Research Conference held at the University of Oklahoma Medical Center. In all, 22 papers were presented and discussed by a total of 36 participants. This volume consists of the editorialized presentations of this meeting under the direction of the senior author.

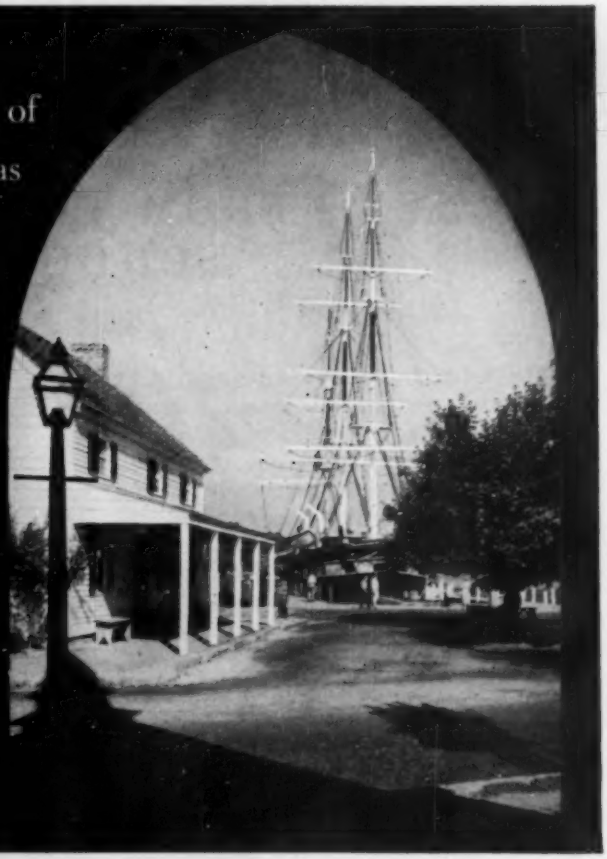
Henry E. Sigerist on the History of Medicine. Edited by FELIX MARTI-IBANEZ. New York: MD Publications, Inc., 1960. 303 pp. $6.75.

In this book are presented a selection of Sigerist's works as made by the author himself as per request in March, 1956. It is published as an anthology, together with some other pieces selected by the present authors as the best examples of his work. An effort has been made to arrange them in some chronological order by periods and by subjects with the object of helping the reader get his bearings. This book attempts to afford a complete perspective of the history of medicine, requiring the reader only to fill in mentally the gaps between one section and the next in order to complete the span of the unfinished bridge that Sigerist started.

from the New England Journal of Medicine:

"The most striking result of this [Singoserp] study has been the relief of the undesirable side effects produced by other rauwolfia preparations."

•Bartels, C. C.: New England J. Med. *261*:785 (Oct. 15) 1959.



results you can confirm in your practice:

"In 24 cases syrosingopine was substituted for the rauwolfia product because of 26 troublesome side effects; these symptoms were relieved in all but 3 patients."•

Side Effects	Incidence with Prior Rauwolfia Agent	Incidence with Singoserp
Depression	11	1
Lethargy or fatigue	5	0
Nasal congestion	7	0
Gastrointestinal disturbances	2	2
Conjunctivitis	1	0

(Adapted from Bartels•)

many hypertensive patients prefer

Singoserp®

(syrosingopine CIBA)

because it lowers their blood pressure without rauwolfia side effects

Tablets, 1 mg. (white, scored); bottles of 100.

CIBA
SUMMIT, NEW JERSEY

Complete information available on request.

8/3779MB

NEWS FROM THE MEDICAL SCHOOLS

Albany

The American Urological Association, at its annual meeting in Chicago recently, named Dr. JOHN E. HESLIN of the Albany Medical College as its president. Dr. Heslin, professor of urology and a member of the clinical faculty for more than 40 years, was named to a one-year term. He is attending urologist at Albany Hospital, and consultant in urology at Saratoga Hospital, Greene County Memorial Hospital in Catskill, Mary McClellan Hospital in Cambridge, Little Falls Hospital, and Veterans Administration Hospital in Albany.

Boston

The Boston University School of Medicine Alumni Association has just topped the half-way mark with $340,000 in their drive to raise $600,000 in funds for the Medical School building program, according to Dr. RONALD W. ADAMS, chairman of the campaign. Now nearing completion is the construction of the university's $3 million medical school research building, adjacent to the present School of Medicine. As the first step in the long-range development program, this structure will provide facilities for basic and clinical research by faculty and graduate students.

Buffalo

Dr. EDWARD F. MARRA, associate professor of preventive medicine in Boston University's School of Medicine, has been named professor and head of the department of preventive medicine at Buffalo. The appointment will become effective August 1. He replaces Dr. ARCHIBALD S. DEAN, who is retiring at the age of 65 from the university post. A member of the Boston faculty since 1953, Dr. Marra is currently chief of the Home Medical Service of the Massachusetts Memorial Hospitals.

University of Chicago

A $450,000 electron gun, said to be the nation's newest cancer-fighting machine, was unveiled June 1, by the University of Chicago. The modern equipment, provided by funds from the Atomic Energy Commission, gives doctors and scientists the greatest degree of control ever achieved over the penetration of high energy rays in medical use. The 25-ton apparatus, called a microwave linear accelerator, is housed in the Argonne Cancer Research hospital operated by the school as part of its medical center for the Atomic Energy Commission. LESTER S. SKAGGS, professor of medical physics, has headed a team of scientists and technicians who have been working to bring Lineac to completion since 1952. Working with him has been associate professor LAWRENCE H. LANZL. Dr. JAMES W. J. CARPENDER, professor of radiology, is in charge of patients treated with the accelerator. He is aided by Dr. MELVIN L. GRIEM and Dr. RALPH M. SCOTT, both assistant professors of radiology. Dr. Carpender said the new instrument is designed primarily for the treatment of cancer that has not escaped from its primary site.

Cincinnati

Dr. JOSEPH A. FREIBERG, associate professor of surgery and director of the orthopedic division, was chosen president-elect of the American Orthopedic Association at the 73rd annual meeting of that organiza-

How you can help today's student prepare to solve tomorrow's medical problems

Recommend these Mosby books that can give him greater understanding of the nature of disease and preventive methods.

Givner-Bruger

THE PREVENTION OF DISEASE IN EVERYDAY PRACTICE

Preventive medicine has now come of age. It is no longer concerned solely with the control of communicable diseases and related subjects. Today this subject is far more inclusive. In this modern text, your students will be introduced to preventive aspects of many diseases such as cancer, allergy, arthritis, diabetes and physical defects resulting from accidents. As you know, these problems will no doubt continue to increase in importance for physicians practicing in the years immediately ahead. Written by 45 practicing physicians, each a specialist in his field, this compact volume gives the student detailed clinical instruction in the prevention of a great variety of diseases he would encounter in general or specialized day-to-day practice. Pointing out the need for more reparative treatment in medicine today, this highly informative text emphasizes how to recognize early signs and symptoms and avoid complications.

By ISADORE GIVNER, B.S., M.D., F.A.C.S.; and MAURICE BRUGER, M.Sc., M.D., C.M., F.A.C.P. and 45 eminent contributors. 1955, 964 pages, 6¾" × 9¾", 50 illustrations. Price, $10.00.

Gladly Sent to Teachers for Consideration As Texts

The C. V. MOSBY Company

3207 Washington Boulevard

St. Louis 3, Missouri

3rd Edition

Anderson

PATHOLOGY

Written by 35 leading pathologists, each an authority in a particular aspect of pathology and ably edited by W. A. D. Anderson, M.D., PATHOLOGY is the most extensively used textbook in its field. It is the first text to adequately consider the endocrine glands, the skin, bone and the joints. The book's orderly division into sections on general processes of disease and special pathology and its terse, definite and understandable language make it the most helpful and easy-to-use text available to give your students a firm foundation in pathology.

Edited by W. A. D. ANDERSON, M.A., M.D., F.A.C.P., F.C.A.P. Written by 35 pathologists. 1957, 3rd edition, 1402 pages, 6⅞" × 10", 1294 illustrations, 11 color plates. Price, $16.00.

Haymaker

BING'S LOCAL DIAGNOSIS IN NEUROLOGICAL DISEASES

Universally known and accepted, this enlarged translation and revision of the 14th German edition provides students with basic functional anatomy on which diagnosis of diseases and other disorders of the central nervous system rest, together with a correlation of the anatomy with signs and symptoms and syndromes. You will especially like the atlas of the cross section of the brain and the extensive bibliography included in this book.

By WEBB HAYMAKER, M.D. 1956, 478 pages, 6¾" × 9¾", 225 illustrations, 9 in color. Price, $16.75.

tion. With Dr. Freiberg's election, the position becomes a family tradition as his father, Dr. Albert H. Freiberg, served in the same post for the AOA in 1913–14.

Florida

CHARLES D. TREXLER has been appointed assistant director of the University of Florida Teaching Hospital and Clinics, in charge of the private diagnostic clinics and private patient services. Trexler is now serving as assistant director of the private diagnostic clinic at North Carolina Memorial Hospital, Chapel Hill, N.C.

Hahnemann

Announcement has been made of the appointment of Dr. WILLIAM B. LIKOFF as head of the cardiovascular section. Simultaneously, the appointments of Dr. PAUL NOVAK as head of the cardiac physiology laboratory; Dr. LEON CANDER as head of the pulmonary physiology laboratory; and Dr. LEONARD DREIFUS as head of the subsection on electrocardiography, were also announced. It is under the cardiovascular section that Hahnemann's recently announced Work Rehabilitation Clinic for patients recovering from heart accidents and heart ailments will function. The new clinic, which will determine the work abilities of patients who have had heart attacks, will incorporate all of the various physical aspects of the cardiovascular section and will draw upon the specialized resources of the hospital's departments of medicine, social service and psychiatry.

Harvard

Dr. KENDALL EMERSON, Jr., assistant dean for admissions and chairman of the committee on admission of the faculty of medicine, resigned to become medical consultant at the Boston Lying-in Hospital. He will continue to serve as associate clinical professor of medicine at Harvard. Taking over his new position July 1, Dr. Emerson will devote more time to his continuing study of the function of the endocrine glands as related to human pregnancy. He will also participate in the teaching program of the hospital, which is academically associated with the Harvard Medical School.

Iowa

Dr. RUBEN NOMLAND, head of the department of dermatology and syphilology, died April 13 at age 61. He had been hospitalized with a heart ailment since April 2. Before going to Iowa, he interned at Cook County Hospital, Chicago, was a fellow at the Mayo Clinic, Rochester, and was on the faculty at Rush Medical College, Chicago.

A former University of Michigan professor has been named professor and head of the department of pharmacology at Iowa's College of Medicine. Dr. LAUREN A. WOODS succeeds Dr. ERWIN G. GROSS, who retired from this position on June 30. Dr. Gross has been at Iowa since 1929 and has been professor and head of the department since 1940.

Kansas

Assistant dean C. ARDEN MILLER took over as dean of the University of Kansas School of Medicine on July 1, succeeding Dr. W. CLARK WESCOE, who assumed the chancellorship of the university on that date. The 35 year old physician has been on the faculty since 1953 as an instructor, assistant professor, and associate professor of pediatrics. Since 1957, he has been assistant dean and medical director of the Medical Center's Children's Rehabilitation Unit.

C. Arden Miller

Dr. Wescoe joined the Kansas faculty in 1951 as professor of pharmacology and experimental medicine after having served on the Cornell faculty of medicine for two years. He was appointed dean of the school in 1952 and was named director of the medical center in 1953.

Jefferson

Women students are now eligible for admission to the Jefferson Medical College, WILLIAM W. BODINE, Jr., president of the institution announced June 7, following action by the board of trustees. As a result, 84 of the nation's 85 medical schools are now co-educational. According to Dr. WILLIAM A. SODEMAN, dean, this action was taken in the belief that Jefferson can thus broaden the base of its service to the city, the commonwealth and the nation. Women have served on the faculty and have taken degrees in graduate courses in the basic medical sciences; the decision to become co-educational in the medical college proper was a logical step he said.

Michigan

Chairman of the otolaryngology department, Dr. JAMES HOYT MAXWELL, died suddenly June 2. A member of the U-M Medical Center staff since graduation from the Medical School in 1927, he served as chairman of the department since July, 1958. Active in national medical groups, he had served on the residency review committee of the American College of Surgeons and the American Medical Association, was a past member of the Board of Governors of the American College of Surgeons, and was secretary of the American Laryngology Association from 1957 to 1959.

Minnesota

The American Cancer Society has established a Cancer Research professorship at the University of Minnesota, and Dr. CARLOS MARTINEZ, professor of physiology, has been appointed to the post. The position is endowed by a $100,000 trust fund, enabling the recipient to pursue a lifetime career in cancer research at his own direction and pace. A native of Argentina, Dr. Martinez earned his Doctor of Medicine and Doctor of Philosophy degrees from the University of Córdoba, and joined the medical school staff in 1951 as an assistant professor of cancer biology. Dr. Martinez' research has been concerned with the hormonal factors in cancer from a genetic and immunological point of view. He has written 87 papers in the fields of endocrinology and immunology.

New York University

Dr. SAUL KRUGMAN, associate professor of pediatrics, has been appointed professor and chairman of the department of pediatrics. He succeeds Dr. L. EMMETT HOLT, Jr., who retired on June 30 to devote full time to his research activities within the department. Dr. Krugman also assumed duties as visiting physician-in-charge of the Children's Medical Service at Bellevue Hospital and as attending physician and director of Pediatric Service at University Hospital.

Dr. Krugman is a graduate of Ohio State University and received his doctor of medicine degree from the Medical College of Virginia. He became an instructor at New York University School of Medicine in 1948 after serving a residency at Bellevue Hospital, receiving successive appointments as assistant professor and associate professor prior to this present appointment.

North Carolina

Dr. NATHAN A. WOMACK, head of the department of surgery, was elected president of the National Board of Medical Examiners at a recent meeting of the board in Philadelphia. He has alos been named president of the United Medical Research Foundation, succeeding Dr. EBEN ALEXANDER, head of the neurosurgery department at Bowman Gray School of Medicine.

Northwestern

The Lucien Howe Gold Medal of the American Ophthalmological Society went this year to Dr. DERRICK T. VAIL in "recognition of his distinguished service to ophthalmology." The medal is considered to be the highest honor in American ophthalmology. Dr. Vail who is professor of ophthalmology and chairman of the department, was chosen for his leadership in this field during the past 35 years through his work as an editor,

teacher, clinician, and surgeon. He is the author of more than 50 papers, several textbooks, and a book for laymen, *The Truth About Your Eyes*. Dr. Vail also serves as editor of the American Journal of Ophthalmology and as associate editor of several other medical publications.

Ceremonies dedicating the Samuel Jefferson Sackett research laboratories were held recently on the university's downtown campus. The laboratories conduct research into rheumatic fever and related diseases.

Mr. Sackett gave the university $600,000 five years ago to establish the facilities. The work on rheumatic fever during the past five years has been under the direction of Dr. GENE H. STOLLERMAN, associate professor of medicine.

Oklahoma

Six staff members of the Federal Aviation Agency's new Civil Aeromedical Research Institute in Oklahoma City have been appointed to part-time teaching positions at the school of medicine. They are: Dr. ROBERT T. CLARK, acting Institute director; Dr. BRUNO BALKE, chief of the biodynamics branch; and Dr. GEORGE THOMAS HAUTY, head of the psychology branch, all named professors of research physiology. Dr. JAMES ALBERT GREEN, chief of the biochemistry branch, appointed associate professor of research biochemistry; Dr. PEI CHIN TANG, neurophysiologist, and Dr. JESS MACK MCKENZIE, chief of the hematology section, named associate and assistant professor, respectively, of research physiology.

Dr. ROBERT A. PATNODE, chief of the Tuberculosis Research Laboratory at the Washington, D.C. Veterans Administration Hospital, joined the Oklahoma medical faculty June 15 as associate professor of microbiology.

Rochester

Dr. J. NEWELL STANNARD, professor of radiation biology and associate professor of pharmacology, was named associate dean of graduate studies, effective July 1. He has been acting in that capacity for the past year. He joined the UR Medical School in 1935 as an assistant in physiology and the following year was appointed to the post of instructor. Dr. Stannard went to Emory University in 1939 as assistant professor of pharmacology and two years later joined the staff of the National Institutes of Health. He returned to Rochester in 1947 as an assistant professor.

Dr. GEORGE H. RAMSEY, professor of radiology and chairman of the department, retired June 30. A member of the faculty for the past 30 years, Dr. Ramsey came to Rochester as an assistant in medicine, two years after he was graduated from McGill University in Canada. He is credited, according to university administrators, as the moving figure behind the development of the $400,000 Radiation Therapy Center at the UR Medical Center, newest in the country, which was opened last November.

Dr. LOUIS H. HEMPELMANN, Jr., professor of experimental radiology, succeeds Dr. Ramsey to the chairmanship of the department. Dr. Hempelmann has been a member of the faculty since 1950, coming as associate professor after two years at the Harvard Medical School where he was a research associate in medicine. He was promoted to full professor in 1951. He is currently directing pioneering studies which include epidemiological surveys of the effect of radiation in man, and has been engaged in this work for approximately eight years. Dr. Hempelmann has been consultant to the Atomic Energy Commission and to the Los Alamos Scientific Laboratory of the University of California since 1950.

Stanford

A former staff member of the Rockefeller Institute for Medical Research in New York City was named Guggenheim professor and executive of the department of medicine at Stanford University School of Medicine. He is Dr. HALSTED R. HOLMAN, who joined the Stanford staff on July 1. He succeeds Dr. DAVID A. RYTAND, Bloomfield professor of medicine, as head of the department. The Stanford appointee is the first

Tampax gives women the freedom to swim, bathe, even skin dive, just as they would at any other time of the month.

Millions of women have used billions of Tampax.
Invented by a doctor for the benefit of all women
...married or single, active or not.
Proved by over 25 years of clinical study.

Tampax® internal sanitary protection is made only by Tampax Incorporated, Palmer, Mass. Samples and literature will be sent upon request to Dept. JME-70

TAMPAX

SO MUCH A PART OF HER ACTIVE LIFE

Guggenheim professor—the professorship being established with a bequest from the estate of the late Mrs. Guggenheim. Dr. Holman received his M.D. degree in 1949 from Yale University School of Medicine and in 1949–50 he was a National Research Council Fellow in biochemistry at Carlsberg, Copenhagen, with Dr Kaj Linderstrom-Lang. Dr. Holman has been at the Rockefeller Institute since 1955.

Seton Hall

Dr. JAMES E. MCCORMACK, Assistant Vice-President of New York City's Presbyterian Hospital since 1955, was named Dean of the Seton Hall College of Medicine. He succeeds the late Dr. Charles L. Brown, first Dean of the School, who died last December.

Dr. J. E. McCormack

A 1939 graduate of New York University's School of Medicine, Dr. McCormack began his teaching career at that university as an assistant in medicine, and served from 1946 to 1950 as Assistant Dean. From 1948 to 1950 he was on leave of absence from NYU to serve as Executive Director of the Committee on Medical Sciences of the Research and Development Board of the Department of Defense. At the same time he served on the faculty of the George Washington University School of Medicine. From 1950 to 1951 he served as Associate Dean of the Post Graduate Medical School of New York University. The following year Dr. McCormack was appointed professor of medicine and Associate Dean of the Post Graduate School of the Columbia University College of Physicians and Surgeons.

The Seton Hall College of Medicine, which opened in New Jersey in 1956, awarded its first medical degrees to 71 students on June 4.

Texas (Medical Branch)

Dr. ARNOLD M. WEISSLER has been appointed assistant director of the cardiovascular research laboratory and assistant professor of internal medicine. Before joining the Texas Medical Branch Dr. Weissler served as chief of the cardiovascular-renal section of Durham Veterans Administration Hospital, Durham, N.C. He also served as instructor and associate of Duke Hospital's department of medicine.

Texas Postgraduate

Dr. MURRAY M. COPELAND resigned his position as professor of oncology at Georgetown University Medical School July 1 to become assistant director for education at the University of Texas, M. D. Anderson Hospital and Tumor Institute of the Texas Medical Center at Houston. In announcing the appointment Dr. R. LEE CLARK, director of the M. D. Anderson Hospital facility indicated that while Dr. Copeland's primary function will be with the office of education, his duties will include professional and public relations, with coverage of the office of director in Dr. Clark's absence.

Dr. Copeland was associated with Georgetown University Medical Center since 1947 as head of the oncology department.

Tulane

Dr. M. E. LAPHAM, who has been dean of the School of Medicine since 1940, is serving as acting president of the university until September 1 when Dr. HERBERT E. LONGNECKER will assume the presidency.

During the time Dr. Lapham is acting president of the university, Dr. CLIFFORD G. GRULEE, associate dean and director of the division of graduate medicine, will serve as acting dean of the School of Medicine.

Wayne State

A new program in medical education at Wayne State University, called the 2–4–2 plan, was explained recently to Liberal Arts advisors from 20 Michigan universities and colleges.

The proposed plan involves two years in

Individual Membership

in the

Association of American Medical Colleges

In recent years the activities of the Association of American Medical Colleges have expanded far beyond the original considerations of administrative problems to the many and varied problems of medical education as encountered by the entire medical school faculty.

The expansion of activities has been due to the growing complexity of medical education —the swift development of the medical sciences, the rapid accumulation of new knowledge to be taught, the pressure for more graduates, the changing patterns of medical care, and countless other factors.

Because of these factors, the AAMC recognizes the need for a professional organization to represent not only the medical schools but the faculty members of these schools. Through the offering of individual membership, the AAMC provides you with the opportunity to exchange ideas, opinions and information through the Annual Meeting, Teaching Institutes, and other activities of the Association.

The AAMC also encourages you to attend the Annual Meeting, not only to meet with others who are teaching in your field and discussing the educational problems that are peculiar to it, but also with the idea of becoming familiar with the entire field of medical education as one of society's most important enterprises. The time has come when teachers of medicine must meet together and discuss the problems and activities that are peculiar to medicine as education just as they are accustomed to meet and talk about medicine as science.

As an Individual Member you are entitled to receive *The Journal of Medical Education*, the only publication devoted exclusively to medical education. The Journal also carries the latest news from the medical schools and provides a valuable service through its Personnel Exchange column. You receive the yearly *Directory*, the Proceedings of the Annual Meetings, and *The Medical Mentor*, a newsletter which will keep you informed on items of current interest in the field of medical education, both nationally and internationally.

Individual Membership, at only $10 a year, is open to any person who has demonstrated a serious interest in medical education over a period of years. All the privileges of membership and a provisional membership card are granted immediately after payment of the $10 fee, although confirmation must await official action at the next Annual Meeting.

To obtain membership, fill out the application form below, append check for $10, and return to the Association's central office at 2530 Ridge Ave., Evanston, Ill.

INDIVIDUAL MEMBERSHIP APPLICATION

ASSOCIATION OF AMERICAN MEDICAL COLLEGES

2530 Ridge Ave., Evanston, Ill.

Name: _____

Mailing Address: _____

_____

(City) (Zone) (State)

Field of medical education in which chief interest lies: _____

_____

College or other connection: _____

_____

the College of Liberal Arts for completion of both liberal arts and pre-medical requirements. The next four years will be divided between the College of Liberal Arts and the College of Medicine. During this period, the medical student will have an integrated program of study leading to the bachelor's degree and completion of the basic medical sciences. The final two years will be spent in clinical training at the College of Medicine and its affiliated hospitals.

Dr. MORTON LEVITT, assistant dean of the College of Medicine said the new plan will provide students with a broader liberal arts background as well as a more effective medical education. Effective September, 1961, almost all students will be admitted to the medical school either through the 2–4–2 plan or with a bachelor's degree. Dr. Levitt pointed out that the College of Medicine will continue to encourage applications from graduates of the various colleges which have traditionally contributed to the WSU medical student enrollment.

Dr. CHARLES G. JOHNSON, head of the surgery department, died of a heart attack June 3 at age 61. He had returned two days before from a round-the-world trip, during which he received a key to the city of Tokyo for his contribution to medical training in Japan. He had made several trips to Japan to work with medical educators there in revising training programs. Dr. Johnson had been on the Wayne State staff since 1936.

Woman's Medical College

Dr. HENRY WILLIAM HARRIS was appointed professor and chairman of the department of medicine. He will leave his present post as chief of medical service at the VA Hospital in Salt Lake City to assume his professorship at Woman's Medical College September 1. A 1943 graduate of the Harvard Medical School, Dr. Harris is an associate of the American College of Physicians and is certified by the American Board of Internal Medicine with a subspecialty in pulmonary disease.

Yale

Yale's two assistant deans, Dr. THOMAS R. FORBES and Dr. ARTHUR EBBERT, Jr., have been named associate deans of the School of Medicine. Dr. Forbes, who is also associate professor of anatomy, supervises student affairs, and Dr. Ebbert, assistant professor of medicine, is in charge of postgraduate medical education.

Dr. JOHN F. FULTON, physiologist and medical historian, died May 29 after a brief illness. He was 60 years old. Recipient of many honors both here and abroad for his work as scientist and scholar, Dr. Fulton had been on the Yale faculty since 1929. In 1951 he relinquished his post as Sterling professor of physiology to fill the newly-created post of Sterling professor of the history of medicine. Next fall he was to have been chairman of the department of the history of science and medicine.

Dr. ROBERT L. ARNSTEIN, for the last six years staff psychiatrist in Yale's department of univesity health and assistant clinical professor of psychiatry at the School of Medicine, has been appointed psychiatrist-in-chief of the university health department. He succeeds Dr. BRYANT M. WEDGE, who resigned July 1 to enter private practice.

Leukemia.....

'LEUKERAN'® brand

CHLORAMBUCIL (formerly known as C. B. 1348)

FOR CHRONIC LYMPHOCYTIC LEUKEMIA

A derivative of nitrogen mustard, it has provided amelioration of follicular lymphoma, lymphocytic lymphoma with or without leukemia, and Hodgkin's disease.

Sugar-coated Tablets of 2 mg.

'MYLERAN'® brand

BUSULFAN

FOR CHRONIC MYELOCYTIC LEUKEMIA

'Myleran' has been reported to induce remissions, lasting up to two years, in chronic myelocytic leukemia. In addition to the decrease in total white cell count and a selective reduction of immature myeloid cells, it usually gives, early after its administration, a rise in hemoglobin level and pronounced subjective improvement.

Tablets of 2 mg.

'PURINETHOL'® brand

MERCAPTOPURINE

FOR ACUTE LEUKEMIA AND CHRONIC MYELOCYTIC LEUKEMIA

'Purinethol' provides worth-while temporary remissions, either partial or complete, in a high percentage of patients. In general, a higher proportion of children than adults with acute leukemia respond favorably.

Tablets of 50 mg.

Facilities for complete and frequent blood counts must be available for patients receiving 'Leukeran', 'Myleran' or 'Purinethol'.

Full information about these products will be sent on request.

BURROUGHS WELLCOME & CO. (U.S.A.) INC., Tuckahoe, New York

ITEMS OF CURRENT INTEREST

Medical School for New Mexico

The Kellogg Foundation, Battle Creek, Mich., has granted $1,082,300 to the University of New Mexico at Albuquerque for construction of a medical school. Plans for the start of a two-year basic science course for medical students and a new $2 million medical building with facilities for 100 students in about five years were outlined recently by the university's president, Thomas Popejoy at a joint meeting of the UNM Board of Regents and the State Legislative Interim Committee on medical education.

Popejoy, working with the committee, the AMA, and the Association of American Medical Colleges, said New Mexico has a most urgent need for doctors with 72 doctors per 100,000 population. At the present time about 40 state students are attending medical colleges in adjacent states, he stated. He called this a satisfactory arrangement for the present but foresaw the time when these medical schools now receiving out-of-state pupils will need their facilities for in-state pupils. He added that increasing enrollment in New Mexico schools in the next 10 years will double the number of students who want medical training.

The Kellogg grant provides funds for additional study, and for buildings. It stipulates that the school must be regional and open to applicants from other states in the area.

Clinical work connected with the medical school will be done at the Bernalillo County-Indian Hospital.

In adopting a resolution approving the two-year basic science school, the House of Delegates of the New Mexico Medical Society asked that a four-year school be established as soon thereafter is as reasonable. The delegates went on record as supporting legislative appropriations for the school.

Society Changes Name

The medical section of the National Tuberculosis Association has changed its name from the American Trudeau Society to the American Thoracic Society, according to Dr. James E. Perkins, NTA managing director. The new name, Dr. Perkins pointed out, reflects more accurately the broad interest of the membership in all diseases of the chest and respiratory tract, as well as tuberculosis.

Organized in 1905 as the American Sanatorium Association, the ATS was reorganized in 1939 as the medical section of the NTA and named in honor of Dr. Trudeau, who established the sanatorium bearing his name at Saranac Lake, N.Y. The Society has a membership of more than 5,000 physicians and other scientists in North America and throughout the world.

Aid for Medical Education Urged

Vice-President of the University of Chicago, Dr. Lowell T. Coggeshall, urged Congress to help expand the nation's medical facilities for teaching doctors. Representing the Association of American Medical Colleges, Dr. Coggeshall made his plea June 6, in a statement prepared for delivery before the House subcommittee on health and safety. He called for passage of legislation such as the Fogarty bill which would provide greater federal aid for modernization and expansion of medical schools. He said that the Fogarty bill recognizes the basic needs which, if neglected, will leave this country inadequately protected to meet its future health requirements. "We have put millions of public and private dollars into research quarters, but relatively nothing for teaching space," he asserted.

In his testimony, Dr. Coggeshall appealed for matching federal grants for

PUBLICATIONS

Useful information for both medical educators and students is published by the Association of American Medical Colleges. These publications may be obtained from the Association headquarters office, 2530 Ridge Avenue, Evanston, Ill.

Books and Pamphlets

Admission Requirements of American Medical Colleges—1959-60 ($2.00).

History of the Association of American Medical Colleges—1876-1956.

The National Health Service of Great Britain ($1.00).

Education of Physicians for Industry ($2.00).

A Study of Medical College Costs ($1.50).

Medical Education for Foreign Scholars in the Medical Sciences ($1.50).

The Journal of MEDICAL EDUCATION

A monthly journal devoted exclusively to medical education.

Subscription rates: $7 per year, $13.50 two years, $19.50 three years. Foreign $8 per year, $15.50 two years, $22.50 three years. Pan America and Canada $7.50 per year, $14.50 two years, $21.00 three years. Single copies $1.00.

Teaching Institute Reports ($2.00 paperbound, $3.00 clothbound).

Report of the Conference on Preventive Medicine in Medical Schools (Report of the 1952 Institute).

The Teaching of Physiology, Biochemistry and Pharmacology (Report of the 1953 Institute).

The Teaching of Pathology, Microbiology, Immunology and Genetics (Report of the 1954 Institute).

The Teaching of Anatomy and Anthropology in Medical Education (Report of the 1955 Institute).

The Appraisal of Applicants to Medical School (Report of the 1956 Institute).

The Ecology of the Medical Student (Report of the 1957 Institute).

Report of the First Institute on Clinical Teaching (Report of the 1958 Institute).

Medical Audio-Visual Institute Publication

Film Catalog

Publications of Related Organizations

Hospitals Participating in the Matching Program 1960 (NIMP).

Results of the Matching Program 1960 (NIMP publication).

The Student and the Matching Program 1960 (NIMP publication).

Medical College Admission Test—Bulletin of Information 1960 (Educational Testing Service—Psychological Corporation).

In addition to the above publications, the American Psychiatric Association, 1785 Massachusetts Ave., N.W., Washington, D.C., still has available copies of the two Institutes on the teaching of psychiatry: Psychiatry in Medical Education—1951 Conference ($1.00) and the Psychiatrist: His Teaching and Development—1952 Conference ($2.50).

FILMS

Films in the Medical Audio-Visual Institute Library are available at the rate of $5.00 per showing, plus postage. Preview prints are available for $2.50, plus postage. Requests should be addressed to the Medical Audio-Visual Institute at 58 E. South Water St., Chicago 1, Ill.

schools which need to preserve the quality of their programs but cannot now expand their enrollment and for new medical schools and those that can expand enrollment.

Dr. Coggeshall is Vice-President for medical affairs at the University of Chicago and chairman of the committee on federal health programs of the AAMC. In 1956 he served as special assistant for health and medical affairs to the Secretary of the Department of Health, Education, and Welfare.

New Appointments to China Medical Board

The China Medical Board of New York, Inc., announced the appointment of Dr. Frank H. Connell as assistant director, effective July 1. Since 1955 Dr. Connell has been head of laboratory services and parasitologist, M. D. Anderson Hospital; professor of parasitology, University of Texas Postgraduate School of Medicine; and clinical professor of parasitology, Baylor University College of Medicine, Houston.

Dr. W. Clarke Wescoe, Dean of the University of Kansas School of Medicine and Director of the Medical Center, was elected a member of the Board. Dr. Wescoe served the China Medical Board in the Far East as visiting professor of pharmacology at the College of Medicine, University of the Philippines, for four months during 1959. Also, in the spring of 1956 he visited Japan as a member of an anesthesiology team supported by The Rockefeller Foundation.

Californian First Recipient of Alan Gregg Travel Fellowship

Dr. W. O. Reinhardt, professor of anatomy and head of the department, the University of California School of Medicine in San Francisco, has been selected as the first recipient of the Alan Gregg Travel Fellowship in Medical Education. Dr. Reinhardt plans to spend nine months in the Far East beginning early next year. The major portion of his study will be conducted in the department of anatomy at Kyoto University Medical School in Japan.

The Fellowship was established last fall to honor the memory of the late Alan Gregg for his outstanding leadership and significant contributions to medical education throughout the world. A second award of the Fellowship will be made in 1961. Applications should be submitted before December 15, 1960, to the Director, China Medical Board of New York, Inc., 30 E. 60th St., New York 22, N.Y. Inquiries should be directed to the same address. It is expected that additional fellowships will be awarded annually at least through 1964.

Heart Association to Spend $9 Million for Research

With 216 newly approved research grants-in-aid, the American Heart Association will spend a new high of more than $9 million for scientific studies to combat diseases of the heart and blood vessels during a 12-month period beginning July 1, Dr. A. Carlton Ernstene, Association president said. Although this is the largest research allocation ever made by the Association, Dr. Ernstene said 45 worthy projects cannot be financed for lack of funds. Heart Fund dollars are supporting scientists in their explorations of the structure and function of the heart muscle itself and the cellular changes that bring about heart failure and heart attacks. Other researchers are looking for better, more effective drugs for treating heart and blood vessel diseases.

Two research scientists in the fields of biochemistry and clinical medicine were named by the American Heart Association to lifetime posts as career investigators.

Dr. Manuel F. Morales, professor and chairman of the department of biochemistry at Dartmouth Medical School, and Dr. Oscar D. Ratnoff, associate professor of medicine at Western Reserve University School of Medicine, are the eighth and ninth to receive such research appointments for the Heart Association. The Career Investigatorship was originated by the Association ten years ago as a then unique addition to

its research program. The outstanding scientists selected for these posts are each given a yearly award for life and have complete freedom to do research of their own choosing at any institution they wish.

New Film in Tissue Culture Series Added to MAVI Film Library

"The Effect of Acetylcholine, Eserine and Atropine on Human Ciliated Respiratory Epithelium" (15 min., sd., b&w, 16 mm) is now available for order from the Medical Audio-Visual Institute, 58 E. South Water St., Chicago 1, Ill. This is the sixth presentation in the Living Human Cells in Culture series, authored by Dr. Charles M. Pomerat of the University of Texas and sponsored by Abbott Laboratories.

Allergy Foundation Awards Summer Scholarships

The Allergy Foundation of America announced the awarding of its $600 summer (or quarterly) scholarships for 1960 to 30 medical students from medical schools throughout the United States and Canada. The students will spend 8 to 12 weeks obtaining supervised training and experience in both clinical and research allergy. This is the largest number of these awards made by the Foundation during any year since the scholarship program was begun in 1956.

The awards are intended to encourage and assist medical students to attain a broader knowledge and better understanding of the allergic diseases. Throughout the tenure of the scholarship, the students work under the supervision and direction of experienced research scientists and clinical teachers.

Wesson Fund Accepting Applications for Financial Aid

Applications for financial grants to the Wesson Fund for Medical Research and Education are now being accepted according to a recent announcement. Wesson president, E. A. Geoghegan, said requests from nonprofit research centers at universities, hospitals and laboratories, as well as applications from private individuals whose primary work is in nutritional research will be screened by a medical advisory board which held its organizational meeting in Miami Beach in June, preceding the A.M.A. convention.

Applicants should direct their written requests to the Wesson Fund, No. 1 E. 45th St., New York 17, N.Y.

U.S. Doctors Assisting in Chilean Disaster

A United States Nutrition Team, working in Chile in conjunction with a large counterpart team from the Chilean medical profession, was concluding its mission and scheduled to return home when earthquakes and floods struck the Latin American country. As a result they elected to remain in Chile, offering their services to the Government in their present disaster. Dr. William F. Ashe, Jr., head of the department of preventive medicine, Ohio State University, and Dr. Carl A. Baumann, professor of biochemistry, the University of Wisconsin, are among the members of the nutrition team. The team has been in Chile for the past two months, working with the Government of Chile in close cooperation with the World Health Organization; Food and Agriculture Organization of the United Nations; U.S. International Cooperation Administration; and the U.S. Military Assistance Advisory Group in Chile.

Government Notes

Veterans Administration. . . . Dr. Benjamin B. Wells, director of medical education service for the VA in Washington, D.C., has been appointed the organization's assistant chief medical director for research and education in medicine. He succeeds Dr. John B. Barnwell, who retired March 17, 1960. Dr. Wells, a former professor and dean of the University of Arkansas School of Medicine, has been with the VA since April, 1957.

Dr. H. Martin Engle, manager of the Veterans Administration hospital in Denver, Colorado, has been named deputy chief medical director for the VA in Washington, D.C. He succeeds Dr. Roy A. Wolford, who retired at the end of April after more than 40 years of Federal service.

Dept. of the Army. . . . The Senate has confirmed the appointment of Colonel Joseph L. Bernier, D.C., as Assistant Surgeon General of the Army with the rank of Major General. He is the seventh Dental Corps officer to hold this rank. Colonel Bernier founded the American Board of Oral Pathology, served as its secretary for over 10 years, and is currently its president.

Dept. of Health, Education, and Welfare. . . . Surgeon General Leroy E. Burney of the Public Health Service announced the appointment of Dr. Robert J. Anderson as deputy chief of the Service's Bureau of State Services. Reporting for duty July 1, he succeeds Dr. Theodore J. Bauer, whose appointment as chief of the Bureau, effective the same date, was announced earlier. For the past four years, Dr. Anderson has been chief of the Communicable Disease Center, a division of the Bureau of State Services located in Atlanta, Ga.

Atomic Energy Commission. . . . The Commission announced 38 grants totaling $378,699 to help equip college and university laboratories for training in nuclear technology as applied to the life sciences.

So You Think You Can't Save Money?

One of your payments should be to yourself. Many families make out a check for U. S. Savings Bonds along with the ones that pay the monthly bills. The check for Bonds comes back to them—$4 for $3 in 7 years, 9 months.

It's all a matter of finding a way to spend less than you earn. Millions of people have discovered a good way to do just that. They use the Payroll Savings Plan to buy U. S. Savings Bonds. Under the Plan any amount they choose is set aside from their pay for Bonds. This makes saving very easy because they've found that the money they don't touch is money they're sure to save—and can't dribble away.

Why U. S. Savings Bonds are such a good way to save

• You can save automatically with the Payroll Savings Plan. • You now earn 3¾% interest at maturity. • You invest without risk under a U.S. Government guarantee. • Your money can't be lost or stolen. • You can get your money, with interest, anytime you want it. • You save more than money—you help your Government pay for peace. • Buy Bonds where you work or bank.

NOW every Savings Bond you own—old or new—earns ½% more than ever before.

You save more than money with U.S. Savings Bonds

The U. S. Government does not pay for this advertising. The Treasury Department thanks The Advertising Council and this magazine for their patriotic donation.

PERSONNEL EXCHANGE

Faculty Vacancies

NEUROLOGIST-INFECTIONIST: Two geographical full-time positions in a 400-bed general hospital with medical school faculty appointments. Duties to include teaching; research will be encouraged. Large Eastern city. Address: V-87.

INTERNIST: Board eligible or board certified, to work with a team in the supervision and management of cardiovascular patients on a home care research and demonstration project at East Coast medical school. Training in cardiovascular diseases desirable. Geographic full-time appointment available. Address: V-88.

ASSISTANT PATHOLOGIST: Three-hundred bed GM & S university affiliated hospital. Salary rate varies from $9,890.00 to $11,355.00 plus 15% if certified by the American Board of Pathology. Apply to J. Mendeloff, M.D., VA Hospital, Atlanta, Ga.

DIRECTOR, MEDICAL EDUCATION: Available July 1, 1960. Newly created position; 312 bed general hospital, fully approved, school of nursing; intern and resident training program. Duties include supervision of intern and resident training, supervision of medical library, serve as chairman of department of medical education, and as coordinator of conferences and all formal staff meetings. Salary open. Apply to Paul G. Wedel, Administrator, The Williamsport Hospital, 777 Rural Ave., Williamsport, Pa.

PHYSIATRIST: Board certified or eligible, for academic appointment in rapidly expanding new department; medical and physical therapy schools, large East Coast city. Excellent opportunity to combine teaching, clinic work and private practice. Address: V-89.

BIOCHEMIST-MICROBIOLOGIST: Position available in medical school pharmacology department for research associate in problems concerned with microbial metabolism, particularly degradation of pharmacologically active compounds. Ph.D. or M.D. with training in microbiology and enzymology. Salary $6,500–8,050 depending on background. Faculty rank with teaching activities optional. Address: V-90.

DIRECTOR OF MEDICAL EDUCATION: Internal medicine specialist preferred for full-time position in 320-bed hospital. Hospital has university affiliation. Beginning salary $18,000 per year. Address: V-91.

PSYCHIATRISTS: Geographical full-time faculty appointments available; one position open in Division of Child Psychiatry and two positions open in Division of Adult Psychiatry, University of Minnesota Medical School. Academic rank and university salary open to negotiation on basis of professional attainments. Opportunities for teaching, research and some private practice. Write to Dr. Donald W. Hastings, Box 393 Mayo Memorial Hospital, Minneapolis 14, Minn.

BIOSTATISTICIAN: Ph.D. Research in child growth studies; opportunities for varied consultation and teaching at Dental School located in large medical center; modern computing facilities available. Salary, from $9,000 and academic rank dependent upon qualifications. Write to Dr. Bhim Savara, Head of Dept., Child Study Clinic, University of Oregon Dental School, 611 S.W. Campus Drive, Portland 1, Oregon.

PHYSIATRIST: Board certified, mature personality, Chief, Physical Medicine and Rehabilitation Service, large affiliated general VA Hospital, Southwest. Challenging residency and research programs. Qualified for professorial appointment. Salary $14,685 to $16,000. Address: V-92.

DIRECTOR OF PROFESSIONAL SERVICES: Large affiliated VA General Hospital. Certified specialist with more than casual experience residencies and research, and flair for administration. Faculty appointment appropriate for qualifications. Active expanding research program. Ambitious, mature personality. $14,685–$16,000. Address: V-93.

PSYCHIATRIST: Full-time academic opportunity for a Board Certified psychiatrist seeking a career in teaching and research in a long established medical school in the Northeast undergoing expansion. Would direct an Out-Patient (adolescent and adult) Psychiatric Clinic team of physicians, psychologists and social workers, and teach groups of senior medical students and psychiatric residents with assistance of eight Board Certified part-time instructors. A limited amount of private practice and consultation work is allowed in addition to salary in the $14,000–$20,000 range; starting figure and academic rank depending upon training and experience. Write to W. L. Holt, Jr., M.D., professor of psychiatry, Albany Medical College, Albany, N.Y.

ANATOMIST: Assistant professor required for teaching gross anatomy. Excellent research opportunities in other branches of anatomy (electron-microscopy, histology, experimental pathology, tissue culture). Salary, $7,300–$8,500 depending on experience and qualifications. Write to R. Altschul, M.D., Department of Anatomy, University of Saskatchewan, Saskatoon, Canada.

ANATOMIST: Medical school in Midwest with excellent research facilities for neurophysiological studies. Teaching assignments in gross and neuroanatomy. Rank and salary dependent upon qualifications. Address: V-94.

MICROBIOLOGIST: The University of Alberta invites applications for the position of assistant professor in the department of medical bacteriology. Candidates should be medically qualified or possess a higher science degree. Experience in medical bacteriology or virology is useful but applicable experience in basic science fields may be as valuable. Teaching and research duties with variable amount of service responsibility depending on nature of appointment. Present salary range $6,000–$8,200. Applications and inquiries which should be accompanied by full curriculum vitae may be sent to the Dean, Faculty of Medicine, the University of Alberta, Edmonton, Alberta, Canada.

BIOCHEMIST: Ph.D., full-time investigation of fundamental aspects of peritonitis plus independent research. Joint academic appointment. Salary dependent upon professional experience. Department of Surgery, Louisiana State University School of Medicine, New Orleans 12, La.

ORTHOPEDIC SURGEON: Professor and head of department of orthopedics required. Full-time position with emphasis on developing research program in East Coast Medical School. Address: V-95.

PEDIATRICIAN: Full-time university appointment. For active teaching program of undergraduates and residents. Interest in teaching general pediatrics and child health; specialized interests also encouraged. Rank and salary commensurate with experience. Mail curriculum vitae to V-96.

PHARMACOLOGIST: Full-time appointment as assistant professor in department of pharmacology, Ph.D. or M.D. Salary, $6,000 to $8,500 according to qualifications. Interested candidates should send a complete curriculum vitae and recent photograph to Dr. M. F. Murnaghan, Professor and Head, Department of Pharmacology, University of Ottawa, Ottawa 2, Ontario, Canada.

To aid in solution of the problem of faculty vacancies, MEDICAL EDUCATION will list persons and positions available, as a free service. The school department or person may have the option of being identified in these columns or of being assigned a key number for each position listed. Mail addressed to key numbers will be forwarded to the person or department listing the request.

Information for these columns should reach the Personnel Exchange, Journal of Medical Education, 2530 Ridge Avenue, Evanston, Illinois, not later than the 10th of the month which precedes the month in which the listings will appear.

Personnel Available

PATHOLOGIST-VIROLOGIST: DVM, Ph.D. Experience in comparative pathology, virology and tissue culture techniques. Also considerable experience in teaching experimental pathology to medical students. Desires teaching appointment in a medical school that would provide opportunity for completion of courses leading to M.D. degree. Address: A-421.

PSYCHIATRIST: Board certified, with training in both general clinical psychiatry and public health psychiatry (M.P.H. degree). Six years' experience in administering a community-oriented psychiatric training program in an academic setting. Broad range of personal service in teaching, supervisory, and consultative capacities. Dynamic orientation. Numerous research publications. Age under 40. Currently assistant professor at medical school. Desires full-time faculty appointment at higher level. Address: A-422.

PSYCHIATRIST: Board certified in psychiatry and child psychiatry (pending). Eight years experience in teaching at student and resident level in adult and child psychiatry in academic setting. Broadly experienced in teaching, supervisory, and consultative capacities. Analytic orientation. Nine publications. Experience in administering child guidance clinic and in community aspects of psychiatry. Has held position as associate professor of psychiatry; wishes to head up division of child psychiatry in medical school in either true or geographic full-time position. Metropolitan area preferred. Age 45; married; 4 children. Address: A-423.

PHYSIOLOGIST-PHARMACOLOGIST: M.D., Ph.D., age 40 Teaching and research experience includes six years in pharmacology and six years in physiology, with one year training in laboratory of high polymer chemistry. Desires academic and research position in physiology or pharmacology department. Address: A-424.

INTERNIST: Board certified, university trained, with one year training in clinical cardiology and one year in cardiovascular laboratory. Presently holding position as university instructor. Desires faculty appointment with teaching and research in clinical cardiology and electrocardiography. Address: A-425.

ANATOMIST: Ten years teaching experience; all phases of medical school anatomy. Broad research interests with grant support in gross anatomy and histology. Desires university appointment. Northeast or northwest preferred. Address: A-426.

ZOOLOGIST: Ph.D., age 43, married, family. Desires teaching microanatomy in medical school. Experience: medical school teaching (medical parasitology); USPHS senior assistant scientist, foreign experience as malariologist; undergraduate teaching, including 6 years instructing pre-medical students in histology. Publications, active research program; current interest: histochemistry techniques in study of cellular basis of resistance to a parasitic infection. Willing also to instruct in parasitology, if situation permits. Available with one semester notice to present employer. Address: A-427.

ANATOMIST: M.B., Ch.B. (Witwatersrand, Johannesburg, South Africa), F.R.C.S. (Edinburgh). Age 52, desires position in medical school as senior lecturer in anatomy. Presently located at University of The Witwatersrand as official lecturer in anatomy; part-time senior lecturer in gross and applied anatomy since 1949. Publications. Surgeon to Union Defence Forces, 1940–46 with rank of major. In private practice as a general surgeon since 1946. Address: A-428.

PHARMACOLOGIST-CLINICAL: M.D., Ph.D., age 33, licensed physician. Publications, academic and industrial experience, some psychiatric training. Desires teaching position. Address: A-430.

HUMAN GENETICIST: Ph.D., age 36, seven years experience at leading human genetics center, including heredity clinic service, population surveys of hereditary traits, and statistical analyses. Fourteen publications. Desires permanent university position, preferably research and teaching. Address: A-431.

CERTIFIED INTERNIST: Age 38, experienced in diabetes, endocrinology, radioisotopes (licensed by AEC). Several years direction of medical residency training program, and radioisotope unit in large teaching hospital, and Assistant Professor of Medicine in charge of student diabetes clinics. Now in private practice. Desires return to full-time teaching hospital and/or medical school. Address: A-433.

GROSS ANATOMIST: Ph.D. Eight years teaching experience; desires academic position in medical or dental school. Available summer 1960. Address: A-434.

PHYSIOLOGIST-BIOCHEMIST: Ph.D. Faculty member medical school. Interdisciplinary major grant research program (3 technicians) in basic and clinical aspects of endocrine physiology, metabolism, biochemistry. Publications, societies, radioisotope experience, training in statistical design. References. Desires faculty career appointment teaching physiology and/or biochemistry with facilities and climate to develop research program. Address: A-435.

INTERNIST: M.D., age 35. Currently on faculty of Eastern medical school. Experience in private practice and industrial medicine. Eight months experience and training in psychiatry. Desires faculty appointment with opportunity for clinical investigation in cardiovascular diseases, as well as teaching general medicine in teaching hospital. Address: A-436.

BIOCHEMIST-ENZYMOLOGIST: Six years teaching and research experience in medical school. Currently assistant professor in Eastern medical school. Available summer, 1960. Desires relocating with appointment in medical school or research institute. Address: A-437.

PHYSIOLOGIST: Ph.D., leading university. Well trained in biological, physical and chemical sciences. Highest scholastic honors, scholarships, former National Research Council Fellow. Well developed research program on the physiology of growth and aging. Offices held in national scientific societies. Present appointment, associate profes-

sor in medical college. Currently in charge of teaching. Seeking appointment with major administrative-teaching responsibilities, with opportunity to continue expanding research study, preferably in the West. Minimum entering salary $12,000. Available Fall, 1960. Address: A-438.

PEDIATRICIAN: Professor and department head. Wishes to relocate for personal reasons. Ten years at present post. Age 43. Numerous publications. Would first consider university or educational foundation position; then, hospital educational program or industry affiliation. Address: A-439.

SURGEON: Cardiovascular and thoracic. M.D. 1947 American medical school. Presently located at Canadian hospital as research fellow in cardiovascular surgery. Desires position in thoracic and cardiovascular surgery, either at clinical level, or in teaching and research. Diplomate, American Board of Surgery. Address: A-440.

HISTOLOGIST-ENDOCRINOLOGIST: Also histochemist-electron microscopist. Age 32; Ph.D., Harvard. Publications, grants and cancer research. Six years teaching experience in histology, embryology and histochemistry. Desires associate professorship or full time research position in a medical school in department of anatomy, biochemistry, pathology or allied clinical science. Address: A-441.

INTERNIST-HEMATOLOGIST: Age 37, Board certified. Interested in all phases of clinical, laboratory, and research hematology, seeking academic position. Experience includes 6 years academic type practice in internal medicine and hematology; brief private practice; research during military service. Address: A-442.

INTERNIST: Experienced in teaching, clinical investigation (metabolism), patient care, and administration. Desires full-time post with teaching hospital-medical school. Age 40. Address: A-443.

PHYSIOLOGIST-PHARMACOLOGIST: Ph.D., 1954. Male, family. Eleven years teaching experience, currently teaching physiology in dental school. Desires academic position with or without research opportunities. Address: A-444.

ANATOMIST: M.B.B.S., University of Karachi, 1955. Four years teaching experience. Currently with anatomy department in a Pakistan medical school. Desires anatomy instructorship in medical school or university, preferably in northern United States, and opportunity to do summer graduate work. Address: A-445.

INTERNIST: Age 33; certified in medicine. Trained in clinical medicine, teaching and research at university hospital and the N.I.H. Director of medical education at university affiliated hospital in New York City for past three and one-half years. Experience in private practice and epidemiology. Desires geographic full-time position at medical school or hospital, with opportunities for teaching and research as well as consultation and imited practice privileges. Address: A-446.

PREVENTIVE MEDICINE PHYSICIAN: M.D., M.P.H. and Dr. P.H. Desires teaching position on medical school faculty. Numerous publications. Previous teaching and health department experience. Special interests are epidemiology, biostatistics, and preventive medicine. Address: A-447.

PSYCHIATRIST: Age 35; board certified, prefers geographic full-time position at level of assistant professor or higher. Presently teaching part-time as clinical instructor. Experience as hospital out-patient clinic director and director of professional education in State hospital. Established in-patient adolescent service. Married, 5 children. Five articles. Address: A-448.

BACTERIOLOGIST-IMMUNOLOGIST: Ph.D. Married, family. Eleven years experience in clinical bacteriology, serology, and blood grouping and as Director of the blood bank. Extensive teaching experience at medical school level. Publications. Desires hospital position with research potential and university faculty status. Address: A-449.

PHYSICIAN: M.Sc., M.D., age 38, presently on staff of Australian university, desires teaching position in department of medicine at American university. Trained in England and United States. Numerous publications; broad background. Speciality, cardio-vascular diseases. Address: A-450.

PEDIATRICIAN-PUBLIC HEALTH: M.D., M.P.H., Past experience includes private clinical practice, teaching preventive medicine and school health. Fellow, American Academy of Pediatrics. Desires part-time position in public or student health with academic affiliation. Address: A-451.

INDEX TO ADVERTISERS

Appleton-Century-Crofts, Inc.	iii
Bausch & Lomb Optical Co.	iv
Burroughs Wellcome & Co., Inc.	xxvii
Ciba Pharmaceutical Products, Inc.	xvii
Eaton Laboratories	3rd cover
Lea & Febiger	vii
Eli Lilly and Company	xvi
McGraw-Hill Book Co., Inc.	2nd cover
Mead Johnson & Company	v, 4th cover
The C. V. Mosby Company	xix
Nuclear-Chicago Corporation	x–xi
W. B. Saunders Company	1st cover, i
Tampax Incorporated	xxiii
Taylor Instrument Companies	xiv
The Upjohn Company	viii–ix
The Williams & Wilkins Company	xii
Wyeth Laboratories	xiii

AN IMPORTANT STATEMENT ON BACTERIAL SENSITIVITY TESTING WITH THE NITROFURANS

The individual nitrofurans — ALTAFUR, FURADANTIN, FUROXONE, FURACIN—*are not interchangeable either in clinical application or in susceptibility testing.* Although chemically related, these compounds differ to a highly significant degree in their range of antibacterial activity as well as in solubility, diffusion rate, and other physical characteristics. For this reason, SENSI-DISCS* containing each of these nitrofurans are provided for appropriate disc plate testing. *Results are valid only for the compound tested.* Cross-interpretation will lead to erroneous conclusions.

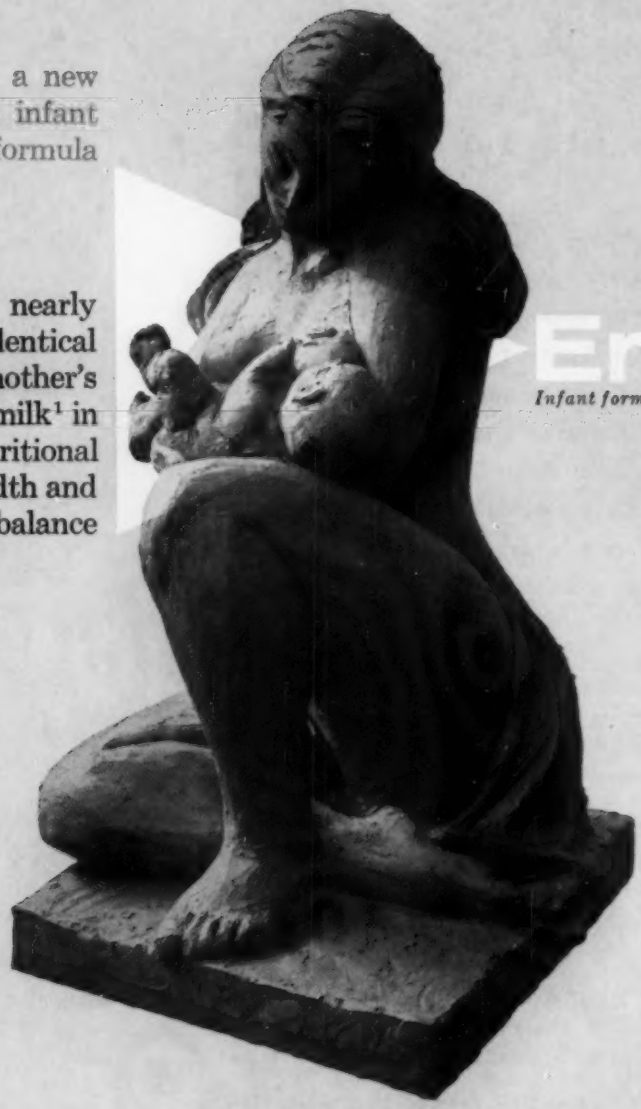
Nitrofuran	*Antibacterial Spectrum*	*Clinical Application*	*For Disc Plate Test Use*
ALTAFUR® (brand of furaltadone)	Wide. Particularly effective against staphylococci, including antibiotic-resistant strains.	Systemic infections, including those of the respiratory tract and soft tissue. (Rapidly absorbed, low urinary excretion.)	ALTAFUR SENSI-DISCS*
FURADANTIN® (brand of nitrofurantoin)	Wide. Highly active against urinary tract pathogens.	Urinary tract infections. (Rapidly absorbed, high urinary excretion.)	FURADANTIN SENSI-DISCS*
FUROXONE® (brand of furazolidone)	Wide. Especially effective against enteric pathogens.	Enteric infections. (Minimal systemic absorption.)	FUROXONE SENSI-DISCS*
FURACIN® (brand of nitrofurazone)	Wide. Encompasses most surface pathogens.	Used topically only.	FURACIN SENSI-DISCS*

*Available from the Baltimore Biological Laboratory (Division of Becton, Dickinson & Co.), Baltimore 18, Md.

NITROFURANS—a *unique* class of antimicrobials EATON LABORATORIES, NORWICH, NEW YORK

a new infant formula

nearly identical to mother's milk[1] in nutritional breadth and balance



Enfamil®

Infant formula

In a well controlled institutional study,[2] Enfamil was thoroughly tested in conjunction with three widely used infant formula products. These investigators report that Enfamil produced:

• good weight gains • soft stool consistency • normal stool frequency

1. Macy, I. G.; Kelly, H. J., and Sloan, R. E.: With the Consultation of the Committee on Maternal and Child Feeding of the Food and Nutrition Board, National Research Council: The Composition of Milks, Publication 254, National Academy of Sciences and National Research Council, Revised 1953. 2. Brown, G. W.; Tuholski, J. M.; Sauer, L. W.; Minsk, L. D., and Rosenstern, I.: Evaluation of Prepared Milks in Infant Nutrition; Use of the Latin Square Technique, J. Pediat. 56:391 (Mar.) 1960.

Mead Johnson

Symbol of service in medicine